Health Care Workforce Needs in Wyoming: Update 2017

Research & Planning
Wyoming DWS

May 2017

Health Care Workforce Needs in Wyoming: Update 2017

June 2017

Wyoming Department of Workforce Services
John Cox, Director

Internet Address: http://doe.state.wy.us/LMI/

Research & Planning
Tom Gallagher, Manager

Prepared by:
Tom Gallagher, Tony Glover, Matthew Halama, Lisa Knapp, Patrick Manning, Lynae Mohondro, and Michael Moore

Editorial Committee:
David Bullard, Katelynd Faler, Matthew Halama, Chris McGrath, Lynae Mohondro, Michael Moore, and Carol Toups

Submitted for Preliminary Review May 2017.

Department of Workforce Services Nondiscrimination Statement
The Department of Workforce Services does not discriminate on the basis of race, color, religion, national origin, sex, age, or disability. It is our intention that all individuals seeking services from our agency be given equal opportunity and that eligibility decisions be based upon applicable statutes, rules, and regulations.

Research & Planning
P.O. Box 2760
Casper, WY 82602
Phone: (307) 473-3807
Fax: (307) 473-3834

R&P Website: http://doe.state.wy.us/LMI/
URL for this publication and the full report:
http://doe.state.wy.us/LMI/health/2017/Health_Care_Update_2017.pdf

"Your Source for Wyoming Labor Market Information"

Who We Are

Research & Planning (R&P) functions as an exclusively statistical entity within the Wyoming Department of Workforce Services. R&P collects, analyzes, and publishes timely and accurate labor market information (LMI) meeting established statistical standards. We work to make the labor market more efficient by providing the public and the public's representatives with the information needed for evidence-based, informed decision making.

Table of Contents

Chapter 1: Introduction

by: Tom Gallagher, Research & Planning Manager

Viable communities provide for public safety, ensure the inter-generational transfer of knowledge through schools and cultural activities, and – very importantly – provide health care for their citizens. This publication examines demand and supply issues for the health care industry in Wyoming. It represents an update to the publication *Health Care Workforce Needs in Wyoming: Advancing the Study*, published in the fall of 2011.

Following a decade of research on the nursing profession in Wyoming, *Advancing the Study* introduced several research innovations, but still left knowledge gaps. *Health Care Workforce Needs in Wyoming: Update 2017* continues the tradition of research innovation. This new publication introduces measures of hours worked, links postsecondary graduation awards to license attainment and employment, and introduces measures of workplace safety. As a result, *Update* provides a better understanding of the extent to which the health care workforce in the state is fully used, provides information on the workforce supply system, and offers an opportunity to identify areas where workplace safety interventions may prove promising, thereby enhancing labor supply.

The most recently available quarterly Unemployment Insurance payroll reveals a decline in employment and wages for six consecutive quarters ending with third quarter 2016 (2016Q3) – one quarter longer than the coal bed methane decline from 2009Q1 to 2010Q1. The available data indicates that contraction persists through 2017Q1. However, even through times of economic downturn, Wyoming's health care sector has continued to grow.

As noted by Faler (in press), between 2009 and 2015, gross domestic product (GDP) – the value of all goods and services produced – for health care & social assistance (NAICS[1] sector 62) grew by 17.3% in the U.S., while total GDP grew by 15.3% (in real 2009 dollars). Total health expenditures nationally represented 7.1% of GDP in 2015. Understanding these national trends and the regional configuration of the health care delivery system is important because spending on health care often takes place outside the community in which one lives. The faster national than state growth in NAICS sector 62 is an indication of strong national competition for health care labor.

Health care spending in Wyoming represents a smaller share of total consumption than at the national level. Its importance as a stabilizing factor in local economies prone to rapid economic expansion and contraction is a characteristic somewhat unique to Wyoming. Employment in the health care & social assistance sector in Wyoming has seen slow steady growth (see Chapter 2). However, because Wyoming's economy is prone to rapid expansion and contraction (compared to most other states), the slow steady growth of health care can appear to be large or small depending on the context provided by the balance of Wyoming's economy. Between 2009 and 2015, Wyoming's gross state product (GSP) in health care grew by 4.0%, about one-fourth of the national growth rate. During Wyoming's expansion in 2009, spending on health care made up 3.7% of GSP. On the other hand, it rose to 4.0% of GSP in

1 North American Industry Classification System.

2015. Total GSP declined by 3.1% between the two time periods. The economic value of health care is determined by its slow steady growth in the context of rapid expansion and contraction in the balance of Wyoming's economy.

The health care delivery system is more than the sum of purchases at local clinics, regional hospitals, or at the retail end of the pharmaceutical supply chain. As this publication makes clear, the system of formal education – as well as the role of the federal government in financing education and supporting the purchase of health care services – must be kept in mind. The total cost of providing health care substantially exceeds the total spending on the production and consumption of health care expressed by GDP and GSP.

The drivers of health care spending are, to a significant degree, financed by the federal budget for Medicare and Medicaid, programs with cost of living adjustments. Therefore, local employment in health care has an economic stabilizing effect (at least in the short run) when other Wyoming job losers and employers reduce overall spending. In terms of relative size, health care spending in Wyoming represents a smaller share of total consumption than it does in the U.S. as a whole. On the other hand, it is important in stabilizing local economies.

Demographics are another key driver in health care consumption and are covered extensively in Chapter 2. Age and gender are important factors associated with household composition and migration. They are associated with health care spending, certain types of health care services, access to employer provided benefits, and access to federal program resources. Health care spending increases as the population ages, even as income declines.

At the national level, the household Consumer Expenditure Survey reveals that spending on health care in households headed by persons ages 45-54 had post-tax incomes of $79,845 in 2015 and spent a mean average of $3,215 on health care. At the same time, households headed by those in the 55-64 age group had mean pre-tax incomes of $63,984 and spent $3,436 on health care, or $221 more than the younger cohort with higher incomes. Even though these are national estimates of earnings and spending, they clearly indicate that income is not the only factor in health care spending. Given the aging of Wyoming's population, the pattern of increased spending on health care as one ages even though income is lower, is a reason for the state to anticipate sustained spending on health care (U.S. Bureau of Labor Statistics, 2016).

Industries differ in the extent to which the labor pipeline passes through postsecondary education in Wyoming and in the extent to which industries rely on importing labor from other parts of the country. As shown in Chapter 2, one in five employed workers in Wyoming during 2015 were nonresidents. On the other hand, in health care & social assistance, only one in 10 workers was a nonresident. Given the high proportion of employment requiring postsecondary education compared to most other industries, more attention needs to be paid to higher education as a supply factor in health care than in many other industries. However, the ratio of resident-to-nonresident workers with all types of educational attainment in this industry varies widely across periods of rapid expansion and

contraction. Moreover, postsecondary education in Wyoming is not always the source of labor supply. The year 2015 represents a period of contraction and lesser reliance on nonresidents.

Retention of Nurses in Wyoming, published by Research & Planning 2008, was based on administrative and survey data collected in 2007 during the peak of the coal bed methane boom. At that time, a majority of nurses working in the state were nonresidents (Harris, et al., 2008, p. 42).

Nativity is important in several ways, among them are social acceptance in the workplace and a propensity toward out-migration during periods of economic decline or coincidental with retirement. The absence of economic opportunity and the attraction of family in other states leads to population impermanence among health care workers (Harris, et al., 2008, pp. 42-44).

Retention concluded that "… at mid-decade almost all new workers in Wyoming came from other states or were natives of Wyoming returning to the state … . Industries driving the in-migration of workers are higher-wage and are dominated by males (mining, construction, wholesale trade). As the families of these workers migrate to the state, spouses who are nurses come to represent a key share of the overall supply…" (Harris, et al., 2008, p. 44). Understanding labor supply issues in health care requires understanding market issues that are not intrinsic to health care itself. Wyoming's economy drives a unique demographic.

Only two in five residents of Wyoming were born here (see ACS reference). Other states like Colorado have similar ratios of native born to residents. However, Colorado is a center of sustained population in-migration, while Wyoming is currently experiencing net out-migration. In Wyoming, periods of rapid employment growth followed by rapid decline characterize the labor supply system and result in a state comprised of non-natives. It also means that the role of formal education in the supply chain for labor is more or less important depending upon the business cycle. Chapter 3 of this publication characterizes the role of formal education in the supply of health care workers. Longitudinal tracking of graduates from Wyoming's postsecondary institutions from the earliest cohort available (2006/07 graduates) reveals that eight years after graduation, only 43.6% could be found working in Wyoming. This health care workforce loss rate in Wyoming is slightly higher than that found in previous studies of young adults leaving Wyoming (Jones, 2005; Harris, et. al, 2008, p. 17; and Glover, 2012).

When *Advancing the Study* was published in 2011, R&P knew a great deal about where the supply of labor in Wyoming originated. Data sharing agreements with state research offices affiliated with U.S. Department of Labor in other states enabled R&P to determine which workers in Wyoming were residents and which were nonresidents. On the other hand, very little was known about the educational attainment of the health care workforce and what role education played in labor supply.

Is holding a certified nursing assistant (CNA) award part of the track to obtaining a postsecondary award in an advanced licensed health care occupation? Is CNA status a predictor of continued employment in a health care industry?

Chapter 4 offers a baseline model for what CNA status can tell us about developing a career pipeline for work in the health care industry. The premise of Chapter 4 is that understanding the baseline workforce-education model in the development of the credentialed occupations is a necessary first step in implementing policies that improve the labor supply.

Chapter 5 presents counts of persons working in licensed health care occupations across time and by age. The distribution of age is important to determining the extent to which worker replacement need (e.g. for reasons relating to retirement or death) should be an immediate consideration in workforce development regardless of anticipated growth. Hours worked for selected occupations in rural and urban settings provide an indication of how the two settings manage different staffing levels at different levels of full-time equivalency. Adding employees in some settings may be preceded by increasing work schedules. A changing population base of patients may not have the same effect on employment opportunities in both rural and urban settings.

The health care delivery system is concentrated in urban settings, where the advanced skills of health care workers can be efficiently integrated into specialized services. Chapter 6 examines health care employment-to-population ratios for sub-state regions in Wyoming, its metropolitan statistical areas (MSA), and adjacent MSAs in adjacent states. The author uses the ratio of health care jobs to population within the U.S. as a whole to establish an appropriate standard of service, then applies those ratios to geographic areas within Wyoming and among neighboring MSAs. Applying a national standard of health care jobs to population lays an empirical foundation for determining the adequacy of local service. Mapping the availability of services illustrates the competitive nature of the health care delivery system.

Finally, reducing the incidence of workplace injury may enhance the supply and productivity of the health care workforce. In Chapter 7, analysts produced a record of workplace safety incidents by combining Workers' Compensation claims records for workers employed in licensed health care occupations. Combining the information in this chapter with other chapters provides a comprehensive perspective on compensation and working conditions for each health care occupation. This chapter benefited substantially from comments provided by Wyoming's State Occupational Epidemiologist.

Most of the data linkages used to develop this report have never before been carried out outside of Wyoming. There are no precedents for the evaluation of this work and several of the chapters represent unique efforts. We welcome comments on how to improve our research approach.

Data, Information, and Analysis: Two Dimensional Data in a Multi-Dimensional World

Update uses a range of statistical tools to organize data about the health care workforce. At the firm and industry levels, *Update* uses the North American Industry Classification System (NAICS), the system State Unemployment Insurance (UI) agencies[2] uses to classify almost all

2 In Wyoming, this is the Department of Workforce Services.

firms, jobs, and payrolls for purposes of administering the UI program, the foundation of the state-federal employment statistical system.

Health care & social assistance[3] (NAICS sector 62) represents firms whose primary function is health care. Industry level data are frequently produced and more current than occupational data. In addition, health care occupations may be found in a variety of industrial sectors especially, but not limited to, educational services (NAICS sector 61) and public administration (NAICS 92). Each chapter of this publication specifies how it uses industry specific (NAICS 62 only) or cross-sector statistics.

Most issues in the labor market are complex, multidimensional, and changing. Rarely is one data source or unit of measure adequate to the question. Workforce supply chains reach from the domain of education into the domain of workforce, and often back again, spanning what could arguably be described as two different languages. Compelling, empirically-based narratives linking these two domains across time are rare.

Much of what we know about the labor market comes from national household surveys conducted by the Census Bureau or surveys of employers by the Bureau of Labor Statistics (BLS). The advantage of these sources is that the results can be compared between states and over time. However, as sample survey estimates programs, the amount of detail is often sparse and the level of error large. These limitations are especially problematic for small, dynamic state economies such as Wyoming's.

3 Social assistance is comprised of vocational rehabilitation, in-home health care services, community food services, and related firms.

Where federal data is cited in *Update*, the original data sources are often state agency administrative records. State UI payrolls, for example, are the single largest component of gross domestic product. Demographic data in Census products are often drawn from state vital statistics and school enrollment reports (in addition to Internal Revenue Service records). In large part, statistical use of administrative data at its core originates in state administrative records.

There is no established, single, integrated, locally relevant system of data about current and future supply and demand issues in health care (or any other domain). To obtain answers, it is necessary to build such a system. And if cost is a consideration, the elements to build the system must be readily available at low cost. Since data elements for the system come from different sources, they must have compatible characteristics facilitating comparison and potential linkage into a single data set. Thus, many of the data elements in this report were initially collected to administer different human resource programs. The challenge is to transform these different data elements into labor supply and demand information.

R&P uses data sharing agreements conforming to federal and state statutes with postsecondary institutions and health care licensing boards to obtain labor supply data elements. R&P's staff link these records to UI employer payroll files to determine whether or not postsecondary awards are meeting employer needs for workers. For example, the linkage is made between the graduation award, licenses, and UI wage earnings records. The common linkage element is the social security number. However, each person can have several awards, licenses, and wage records (jobs) at any point in time

and across time. One of the goals in this analysis is to simplify data presentation to conform to everyday usage concepts. However, people are multidimensional in their behavior and often no single dimension is more relevant than another in addressing a particular research question. The dynamic of workforce interaction with education and the market over time, results in complexity, a fact that cannot be dismissed as simply inconvenient.

The most frequently used concepts in labor market analysis are those of

(Text continued on page 11)

Table 1.1: Number of Jobs Worked in Selected Health Care Related Occupations in Wyoming by Industry, 2016

		Industry and NAICS[b] Code					
SOC[a] Code	Occupation	Total	Retail Trade (NAICS 44-45)	Educa-tional Services (NAICS 61)	Health Care & Social Assist. (NAICS 62)	Public Admin. (NAICS 92)	Balance of Industries
00-0000	Total Healthcare Occupations	23,845	858	725	19,091	2,636	N/D
19-3031	Clinical, Counseling, & School Psychologists	199	0	126	66	N/D	N/D
21-1011	Substance Abuse & Behavioral Disorder Counselors	190	0	N/D	153	32	N/D
21-1013	Marriage & Family Therapists	40	0	0	40	0	0
21-1014	Mental Health Counselors	324	0	N/D	296	N/D	0
21-1015	Rehabilitation Counselors	155	0	0	112	N/D	0
21-1021	Child, Family, & School Social Workers	774	0	N/D	325	276	N/D
21-1022	Healthcare Social Workers	177	0	0	123	N/D	N/D
21-1023	Mental Health & Substance Abuse Social Workers	128	0	0	123	N/D	N/D
21-1029	Social Workers, All Other	N/D	0	0	20	N/D	0
29-1011	Chiropractors	77	0	0	77	0	0
29-1022	Oral & Maxillofacial Surgeons	N/D	0	0	N/D	0	0
29-1023	Orthodontists	N/D	0	0	N/D	0	0
29-1029	Dentists, General	236	0	0	225	11	0
29-1031	Dietitians & Nutritionists	88	0	N/D	56	N/D	N/D
29-1041	Optometrists	86	0	0	N/D	N/D	0
29-1051	Pharmacists	537	317	N/D	144	47	N/D
29-1061	Anesthesiologists	57	0	0	57	0	0
29-1062	Family & General Practitioners	263	0	N/D	251	N/D	N/D
29-1063	Internists, General	56	0	0	56	0	0
29-1064	Obstetricians & Gynecologists	61	0	0	61	0	0
29-1065	Pediatricians, General	42	0	0	42	0	0
29-1066	Psychiatrists	40	0	0	40	0	0
29-1067	Surgeons	107	0	0	107	0	0
29-1069	Physicians & Surgeons, All Other	375	0	0	315	60	0
29-1071	Physician Assistants	221	0	N/D	210	N/D	0
29-1081	Podiatrists	N/D	0	0	N/D	N/D	0
29-1111	Registered Nurses	5,217	0	N/D	4,182	699	N/D
29-1122	Occupational Therapists	275	0	46	208	N/D	N/D

[a]Standard Occupational Classification.
[b]North American Industry Classification System.
N/D = Not discloseable due to confidentiality.
Source: Occupational Employment Statistics.
Prepared by T. Glover, Research & Planning, WY DWS, 3/30/17.

(Table continued on page 10)

(Table continued from page 9)

Table 1.1: Number of Jobs Worked in Selected Health Care Related Occupations in Wyoming by Industry, 2016

SOC[a] Code	Occupation	Total	Industry and NAICS[b] Code				
			Retail Trade (NAICS 44-45)	Educational Services (NAICS 61)	Health Care & Social Assist. (NAICS 62)	Public Admin. (NAICS 92)	Balance of Industries
29-1123	Physical Therapists	417	0	N/D	378	28	N/D
29-1124	Radiation Therapists	28	0	0	N/D	N/D	0
29-1125	Recreational Therapists	46	0	N/D	N/D	29	0
29-1126	Respiratory Therapists	215	0	0	200	N/D	14
29-1127	Speech-Language Pathologists	309	0	153	139	N/D	N/D
29-1181	Audiologists	24	0	N/D	N/D	0	0
29-1199	Health Diagnosing & Treating Practitioners, All Other	39	0	0	21	18	0
29-2011	Medical & Clinical Laboratory Technologists	285	0	0	225	61	0
29-2012	Medical & Clinical Laboratory Technicians	164	0	0	N/D	N/D	0
29-2021	Dental Hygienists	486	0	0	N/D	N/D	0
29-2031	Cardiovascular Technologists & Technicians	49	0	0	49	0	0
29-2032	Diagnostic Medical Sonographers	72	0	0	72	0	0
29-2033	Nuclear Medicine Technologists	24	0	0	24	0	0
29-2034	Radiologic Technologists & Technicians	435	0	N/D	N/D	27	0
29-2041	Emergency Medical Technicians & Paramedics	705	0	0	520	N/D	N/D
29-2051	Dietetic Technicians	N/D	0	0	N/D	0	0
29-2052	Pharmacy Technicians	568	404	N/D	87	61	N/D
29-2053	Psychiatric Technicians	N/D	0	0	N/D	0	0
29-2054	Respiratory Therapy Technicians	N/D	0	0	N/D	0	0
29-2055	Surgical Technologists	176	0	0	N/D	0	N/D
29-2061	Licensed Practical & Licensed Vocational Nurses	677	0	N/D	560	109	N/D
29-2071	Medical Records & Health Information Technicians	335	0	0	290	N/D	N/D
29-2081	Opticians, Dispensing	238	N/D	0	139	0	N/D
29-2091	Orthotists & Prosthetists	N/D	0	0	N/D	N/D	N/D
29-2099	Ophthalmic Medical Technicians	167	0	N/D	150	N/D	N/D
31-1011	Home Health Aides	879	0	0	N/D	N/D	0
31-1012	Orderlies	3,060	0	N/D	2,498	511	N/D
31-1013	Psychiatric Aides	95	0	0	95	0	0
31-2011	Occupational Therapy Assistants	79	0	N/D	68	N/D	N/D
31-2012	Occupational Therapy Aides	N/D	0	N/D	N/D	0	0
31-2021	Physical Therapist Assistants	154	0	0	N/D	N/D	0
31-2022	Physical Therapist Aides	142	0	0	N/D	0	N/D
31-9011	Massage Therapists	116	0	N/D	50	N/D	N/D
31-9091	Dental Assistants	643	0	0	631	12	0
31-9092	Medical Assistants	632	0	N/D	618	N/D	0
31-9093	Medical Equipment Preparers	84	0	0	84	0	0
31-9094	Medical Transcriptionists	77	0	0	N/D	0	N/D
31-9095	Pharmacy Aides	42	N/D	0	N/D	0	0
31-9099	Phlebotomists	481	0	N/D	393	N/D	N/D
39-9021	Personal Care Aides	1,892	0	0	1,822	N/D	N/D

[a]Standard Occupational Classification.
[b]North American Industry Classification System.
N/D = Not discloseable due to confidentiality.
Source: Occupational Employment Statistics.
Prepared by T. Glover, Research & Planning, WY DWS, 3/30/17.

(Text continued from page 9)

industry and occupation. An industry represents the economics of production. Firms having similar production functions are grouped together in industrial sectors. An occupation is defined as a set of tasks and activities performed by workers or required by jobs. Table 1.1 presents a cross tabulation of health care occupations across all industrial sectors in Wyoming.

Table 1.1 represents estimates of jobs worked (rather than persons working) from a sample survey of firms as part of the BLS Occupational Employment Statistics (OES) – state cooperative statistical program. The OES program uses the Standard Occupational Classification (SOC) system to group jobs into common occupational categories. *Update* uses the SOC to classify jobs, persons working, and health care licenses.

As a sample survey, OES estimates are subject to estimation error. Licensing files may contain errors associated with data entry, intentional misrepresentation, processing, and maintenance. Therefore comparisons across chapters will encounter differences because the unit of measure may change even though the system of coding, e.g. the SOC, remains the same.

All of the classification systems in used in *Update* are hierarchical, and comprised of mutually exclusive and exhaustive categories (see Figure 1.1, page 12). Mutual exclusivity means that each firm, license, or job can fit into only one category within the same classification system. A system is said to be exhaustive if all of the data subject to classification fits into one category. Hierarchical classification systems have general categories containing greater quantities comprised of similar but differentiated subsets. Health care & social assistance (NAICS 62), for example, includes ambulatory care (NAICS 621), hospitals (NAICS 622), and nursing & residential care (NAICS 623), as well as other subsets of firms.

Acknowledgements

Research & Planning would like to thank the state licensing boards with which it has data sharing agreements, without whom this research would not have been possible. These boards include, but are not limited to, the Board of Registration in Podiatry, Board of Speech Pathology & Audiology, Board of Hearing Aid Specialists, Board of Dental Examiners, Wyoming Board of Funeral Service Practitioners, Wyoming State Board of Nursing, Board of Examiners in Optometry, Wyoming Board of Physical Therapy, State Board of Psychology, Board of Chiropractic Examiners, Wyoming Board of Radiologic Technologist Examiners, Wyoming State Board of Respiratory Care, Nursing Home Administrators, State Board of Medicine, Mental Health Licensing Board, and Board of Occupational Therapy.

References

Faler, K. (In press). Wyoming's gross state product: 2009-2015.

Glover, G. (2012, March). A decade later: Tracking Wyoming's youth into the labor force. *Wyoming Labor Force Trends, 49*(3). Retrieved May 24, 2017, from http://doe.state.wy.us/LMI/trends/0312/a1.htm

Harris, M., et al. (2008, August). *Retention of Nurses in Wyoming*. Retrieved May 23, 2017, from http://doe.state.wy.us/LMI/nursing_retention_08.pdf

Jones, S. (2005, June). Labor retention: Out-migration of youth. *Wyoming Labor Force Trends, 42*(6). Retrieved May 24, 2017, from http://doe.state.wy.us/LMI/0605/a1.htm

U.S. Bureau of Labor Statistics (2016, August). Table 1300: Age of reference person: Annual expenditure means, shares, standard errors, and coefficients of variation. Consumer Expenditure Survey, 2015. Retrieved May 23, 2017, from https://www.bls.gov/cex/2015/combined/age.pdf

U.S. Census Bureau. (2016). Table 1: State of Residence by State of Birth. 2015 American Community Survey. Retrieved May 24, 2017, from http://census.gov/acs

Figure 1.1: Hierarchical Classification Systems Used in this Report

Classification of Instructional Programs (CIP)	A code system maintained by the National Center for Education Statistics (NCES) categorized by two-, four-, and six-digit levels of instructional programs. The purpose of the classification system is to support the accurate tracking, assessment, and reporting of fields of study and program completions activity. A complete listing of CIP codes can be found at https://nces.ed.gov/pubs2002/cip2000/. Example of CIP Code Structure 2-Digit CIP: 510000 Health Professions and Related Programs 4-Digit: 510200 Communication Disorders Sciences and Services 6-Digit: 510204 Audiology/Audiologist & Speech Language Pathology/Pathologist 4-Digit: 513800 Registered Nursing, Nursing Administration, Nursing Research, & Clinical Nursing 6-Digit: 513801 Registered Nursing/Registered Nurse
North American Industry Classification System (NAICS)	In general, an industry refers to the type of firm for which a person works. Rather than grouping according to the final product or service, the North American Industry Classification System (NAICS*) categorizes firms based on production process. However, the final product or service is usually similar for establishments within an industry. NAICS code structure has a similar 2-Digit, 4-Digit, 6-Digit structure as CIP codes. A full list of industries can be found at https://www.census.gov/eos/www/naics/. Example of NAICS Code Structure 2-Digit NAICS: 620000 Health Care and Social Assistance 4-Digit NAICS: 621000 Ambulatory Health Care Services 5-Digit NAICS: 62111 Offices of Physicians 6-Digit NAICS: 621111 Offices of Physicians (except Mental Health Specialists) 6-Digit NAICS: 621112 Offices of Physicians, Mental Health Specialists
Standard Occupational Classification (SOC)	"The 2010 Standard Occupational Classification (SOC) system is used by Federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data. All workers are classified into one of 840 detailed occupations according to their occupational definition." (U.S. Bureau of Labor Statistics.) A full list of occupations can be found at https://www.bls.gov/soc/soc_structure_2010.pdf. Example of SOC Code Structure SOC Major Group: 29-0000 Healthcare Practitioners and Technical Occupations SOC Minor Group: 29-1000 Health Diagnosing and Treating Practitioners SOC Broad Group: 29-1120 Therapists SOC Detailed Occupation: 29-1123 Physical Therapists

Chapter Highlights and Key Findings

Chapter 2

Wyoming is the least populated state in the nation with an estimated 586,107 people, according to 2015 U.S. Census Bureau estimates. The median age in Wyoming in 2015 was 36.9. Wyoming's population is aging due to the large number of individuals ages 55 and older, but also due to migration patterns that take younger individuals out of state for higher education or employment opportunities.

In 2011/2012 there were 30,222 in-migrants and 26,936 out-migrants, leaving a net in-migration of 3,286. During 2014/2015 there were 18,277 in-migrants and 18,079 out-migrants, leaving a net in-migration of 198 people.

A shortage of nurses, specifically those trained in geriatric medicine, is projected within the next 10 years.

Key finding: At mid-decade Wyoming's population is decreasing and aging.

Chapter 3

Wyoming's health care industry has an older workforce. When the aging health care workers retire, possibly having greater health care needs themselves, the need for more health care workers in Wyoming grows.

Less than half of Wyoming's postsecondary education students who graduated with a degree in health care in 2006/07 remained working in Wyoming eight years after graduation. The migration of postsecondary education graduates creates an even greater replacement need for future graduates going into the health care workforce.

Key finding: Young workers from Wyoming tend to leave to work in other states.

Chapter 4

A cohort of certified nursing assistants (CNA) from 2010 was researched to identify their education and experience in the labor market by 2015.

Of all CNAs certified in Wyoming in 2010, 57.8% no longer held a certificate or license from any licensing board in Wyoming in 2015. By 2015, only 30.7% of CNAs from 2010 still held a CNA certificate as their highest certificate or license. An additional 8.6% were licensed as registered nurses (RNs) by 2015, and another 1.3% became licensed as an LPN or vocational nurse.

Key finding: Fewer than half of all individuals with CNA licensing in Wyoming were still working in a licensed health care occupation in the state five years later.

Chapter 5

Among all licensed health care occupations, the greatest increase in the number

of persons working from third quarter 2010 (2010Q3) to third quarter 2015 (2015Q3) was seen in RNs (an increase of 726 people, or 14.8%). The greatest decrease was seen in CNAs (a decrease of 174 people, or -4.0%).

Health care needs are met differently in rural and urban areas in Wyoming. In 2015Q3, RNs made up a greater proportion of all licensed health care occupations in urban areas, while CNAs made up a greater proportion in rural areas.

In some instances, individuals working in licensed health care occupations in Wyoming may work more hours in urban areas than those in rural areas. For example, RNs in urban areas worked 512 hours per quarter-with 520 hours equaling a 40-hour week across an entire calendar quarter-on average in 2015Q3, compared to 474 hours for RNs in rural areas.

Key finding: RNs make up a greater proportion of the health care workforce in urban areas, while CNAs account for a greater proportion in rural areas.

Chapter 6

Current Occupational Employment Statistics (OES) staffing pattern data collected at the national, state, and sub-state region level show differing degrees of need and surplus for several licensed health care occupations in Wyoming.

For example, in 2015, the national rate for RNs was 91.1 for every 10,000 individuals in the population. In the Casper metropolitan statistical area (MSA), the rate was 119.3 for every 10,000 individuals in the population. However, this apparent surplus may be due to the fact that Casper is a regional destination for health care needs in Wyoming, and serves individuals from other counties seeking health care.

Key finding: Larger areas, such as Natrona County, may appear overstaffed with certain licensed health care occupations. In reality, this perceived surplus may actually be due Natrona County's status as a regional destination for health care.

Chapter 7

Wyoming's health care & social assistance industry demonstrated the second highest rate of injury incidence (1.4%, or a rate of 1.4 injuries for every 100 workers) of all industries in the state from 2010 to 2015, second only to manufacturing (1.6%).

Nurses tended to have relatively high injury incidence rates, with CNAs topping the list at an incidence rate of 2.8%. This rate was more than three times greater than the overall rate of 0.9% across all industries and occupations.

Key finding: Labor supply for nursing assistants (CNAs), licensed practical and vocational nurses, respiratory therapists, and registered nurses (RNs) could be enhanced by workplace safety intervention.

Chapter 2: Analysis of Wyoming's Demographics and the Health Care Workforce

by: Lisa Knapp, Senior Research Analyst

Wyoming has a comparatively small population spread across a large land area. In 2010, 35.2% of the state's population lived in areas defined as rural by the U.S. Census Bureau[1]. Individuals living in rural areas face unique obstacles to health care that may not apply to those living in urban areas; those individuals living in rural areas tend to be older and less healthy, have fewer available doctors and other health care providers, and must travel longer distances for health care. In addition, a smaller proportion of the population living in rural areas tend to be covered by medical insurance (Meit, et al., 2014).

Beginning in second quarter 2015 (2015Q2), Wyoming experienced an economic downturn caused by "a substantial decline in the prices of oil, and extended period of low natural gas prices, and the erosion in the price of coal" (Gallagher, 2016). This downturn continued

1 The U.S. Census Bureau defines rural as what is not urban — that is, after defining individual urban areas, rural is what is left. For an in-depth explanation of this issue, see http://www2.census.gov/geo/pdfs/reference/ua/Defining_Rural.pdf.

In This Chapter

through 2016Q3, the most recent period for which data were available at the time of publication. During this period of economic downturn, Wyoming experienced a decrease both in the number of jobs worked and in the number of persons working, particularly in the mining industry (Moore, 2017). However, even as other industries were experiencing job losses, Wyoming's health care & social assistance industry experienced job growth.

The purpose of this chapter is to examine the reasons behind the growth in health care & social assistance, particularly increased medical care consumption by an aging population and increased health care spending due to increases in insurance coverage from the Affordable Care Act and increased federal spending on programs such as Medicare. This chapter also includes a discussion about the implications of continued employment growth within health care & social assistance.

Table 2.1: Estimated Population Density (Number of People per Square Mile of Land Area) of the United States and Selected States, 2015

State	Square Miles	Estimated 2015 Population	Persons per Square Mile
United States	3,531,905	321,418,820	91.0
Wyoming	97,093	586,107	6.0
Montana	145,546	1,032,949	7.1
Idaho	82,643	1,654,930	20.0
Utah	82,170	2,995,919	36.5
Colorado	103,642	5,456,574	52.6
Nebraska	76,824	1,896,190	24.7
South Dakota	75,811	858,469	11.3

Source: U.S. Census Bureau.
Prepared by L. Knapp, Research & Planning, WY DWS, 11/18/16.

Table 2.2: Population Estimates for Selected Generations in Wyoming, 2010-2015

Year	Millennials	Generation X	Baby Boomers	Total	Median Age WY	Median Age U.S.
2010	131,758	109,590	150,039	561,360	36.9	37.2
2015	137,054	109,775	143,175	583,115	36.9	37.8
Change N	5,296	185	-6,864	21,755	0.0	0.6
Change %	4.0	0.2	-4.6	3.9		

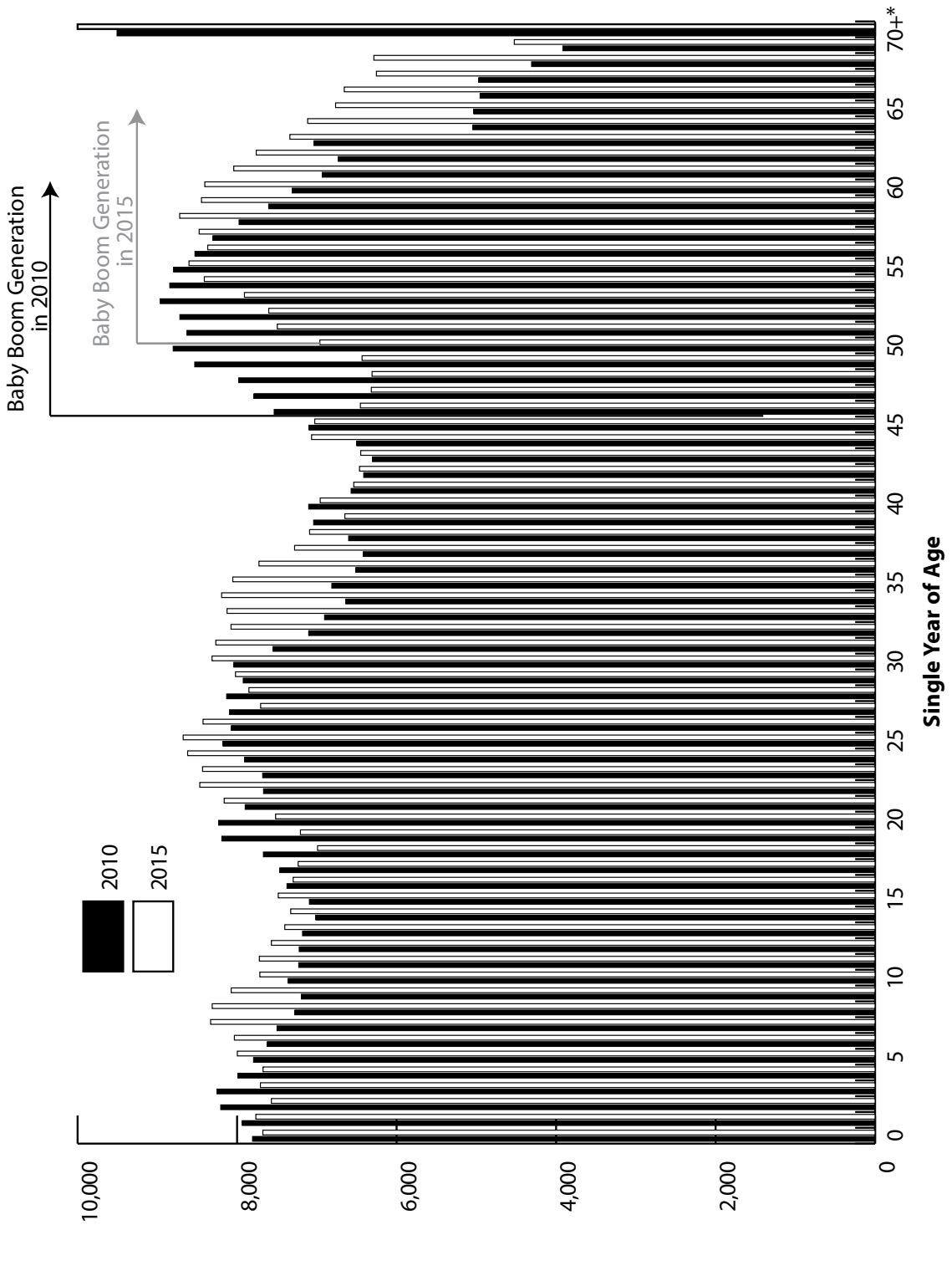
Millennials born 1981-1997.
Generation X born 1965-1980.
Baby Boomers born 1946-1964.
Source: Pew Research Center.
Data source: U.S. Census Bureau. Annual Estimates of the Resident Population by Single Year of Age and Sex for the United States, States, and Puerto Rico Commonwealth: April 1, 2010 to July 1, 2015.
Prepared by M. Moore, Research & Planning, WY DWS, 5/10/17.

Demographics

Wyoming is the least populated state in the nation. In 2015, there were approximately 91.0 people per square mile living in the United States, but only 6.0 people per square mile living in Wyoming (see Table 2.1). By comparison, Montana was home to approximately 7.1 people per square mile, Colorado had approximately 52.6 people per square mile, and an estimated 20 people per square mile lived in Utah.

As shown in Figure 2.1 (see page 17), Wyoming's population has continued to age since 2010, despite a decline in the state's baby boomer population (see Table 2.2). Baby boomers include people born between 1946 and 1964 (Vincent & Velkoff, 2010), and currently constitute the second largest living generation of people in the country behind millennials, who were born between 1981 and 1997 (Fry, 2016). In 2015, baby boomers were between the ages of 51 and 69. Nationally,

(Text continued on page 18)



Baby boom generation: born between 1946 and 1964.
*Ages 70+: 2010 N = 21,245; 2015 N = 24,174.
Source: U.S. Census Bureau. Population estimates by single year of age: July 1, 2010, and July 1, 2015.
Revised by L. Knapp and M. Moore, Research & Planning, WY DWS, 2/21/17.

Figure 2.1: **Wyoming Population Estimates by Single Year of Age, 2010 and 2015**

(Text continued from page 16)

according to the U.S. Census Bureau (Colby & Ortman, 2014), baby boomers will comprise approximately 20% of the country's population by 2029, and a similar proportion of Wyoming's population as well.

In both 2010 and 2015, the median age of Wyoming residents was 36.9 years of age; the median age in 2016 may have been higher due to job losses in the mining industry and the out-migration of jobseekers during the current economic downturn, which will be discussed later in this chapter.

In 2015, 28.3% of the state's population was age 55 or older (see Table 2.3), and at least one-fifth of the population in each county was age 55 and older. However, not all counties are aging at the same rate. The proportion of older adults was larger in some counties in 2015, such as Hot Springs (41.3%), Platte (39.3%), and Johnson (37.5%). In comparison, counties such as Albany (20.3%), Campbell (20.4%), Sweetwater (23.4%), and Uinta (25.7%) had smaller proportions of older people.

Figure 2.2 (see page 19) shows a comparison of the proportion of the population age 55 or older in 2010 and 2015. By 2015, those people who were age 55 or older comprised 4.7% more of the total population in Lincoln County and 4.5% more of the population in Sublette and Uinta

Table 2.3: Number and Percent of Wyoming Resident Population Under Age 55 and Ages 55 and Older by County, 2010 and 2015

	2010					2015				
	Under 55		55 and Older		Total	Under 55		55 and Older		Total
County	N	%	N	%	N	N	%	N	%	N
Albany	29,610	81.3	6,818	18.7	36,428	30,236	79.7	7,720	20.3	37,956
Big Horn	7,879	67.5	3,793	32.5	11,672	7,965	66.3	4,057	33.7	12,022
Campbell	38,594	83.5	7,650	16.5	46,244	39,169	79.6	10,051	20.4	49,220
Carbon	11,550	72.9	4,287	27.1	15,837	11,064	71.1	4,495	28.9	15,559
Converse	10,145	73.4	3,681	26.6	13,826	10,216	71.8	4,020	28.2	14,236
Crook	4,857	68.3	2,257	31.7	7,114	4,880	65.6	2,564	34.4	7,444
Fremont	28,854	71.7	11,368	28.3	40,222	27,706	68.7	12,609	31.3	40,315
Goshen	8,993	67.1	4,415	32.9	13,408	8,586	64.2	4,797	35.8	13,383
Hot Springs	2,951	61.3	1,862	38.7	4,813	2,782	58.7	1,959	41.3	4,741
Johnson	5,594	65.2	2,987	34.8	8,581	5,367	62.5	3,218	37.5	8,585
Laramie	68,796	74.6	23,475	25.4	92,271	70,195	72.3	26,926	27.7	97,121
Lincoln	13,391	74.0	4,700	26.0	18,091	12,976	69.3	5,746	30.7	18,722
Natrona	56,356	74.7	19,116	25.3	75,472	60,192	73.2	21,986	26.8	82,178
Niobrara	1,604	64.4	888	35.6	2,492	1,632	64.2	910	35.8	2,542
Park	18,775	66.4	9,484	33.6	28,259	18,426	63.0	10,802	37.0	29,228
Platte	5,408	62.3	3,270	37.7	8,678	5,353	60.7	3,459	39.3	8,812
Sheridan	20,012	68.7	9,134	31.3	29,146	19,513	65.0	10,496	35.0	30,009
Sublette	7,779	75.9	2,465	24.1	10,244	7,075	71.5	2,824	28.5	9,899
Sweetwater	34,724	79.7	8,869	20.3	43,593	34,199	76.6	10,427	23.4	44,626
Teton	16,355	76.8	4,942	23.2	21,297	16,955	73.3	6,170	26.7	23,125
Uinta	16,615	78.7	4,487	21.3	21,102	15,461	74.3	5,361	25.7	20,822
Washakie	5,837	68.3	2,708	31.7	8,545	5,428	65.2	2,900	34.8	8,328
Weston	4,969	69.2	2,212	30.8	7,181	4,744	65.6	2,490	34.4	7,234
Total	**419,648**	**74.3**	**144,868**	**25.7**	**564,516**	**420,120**	**71.7**	**165,987**	**28.3**	**586,107**

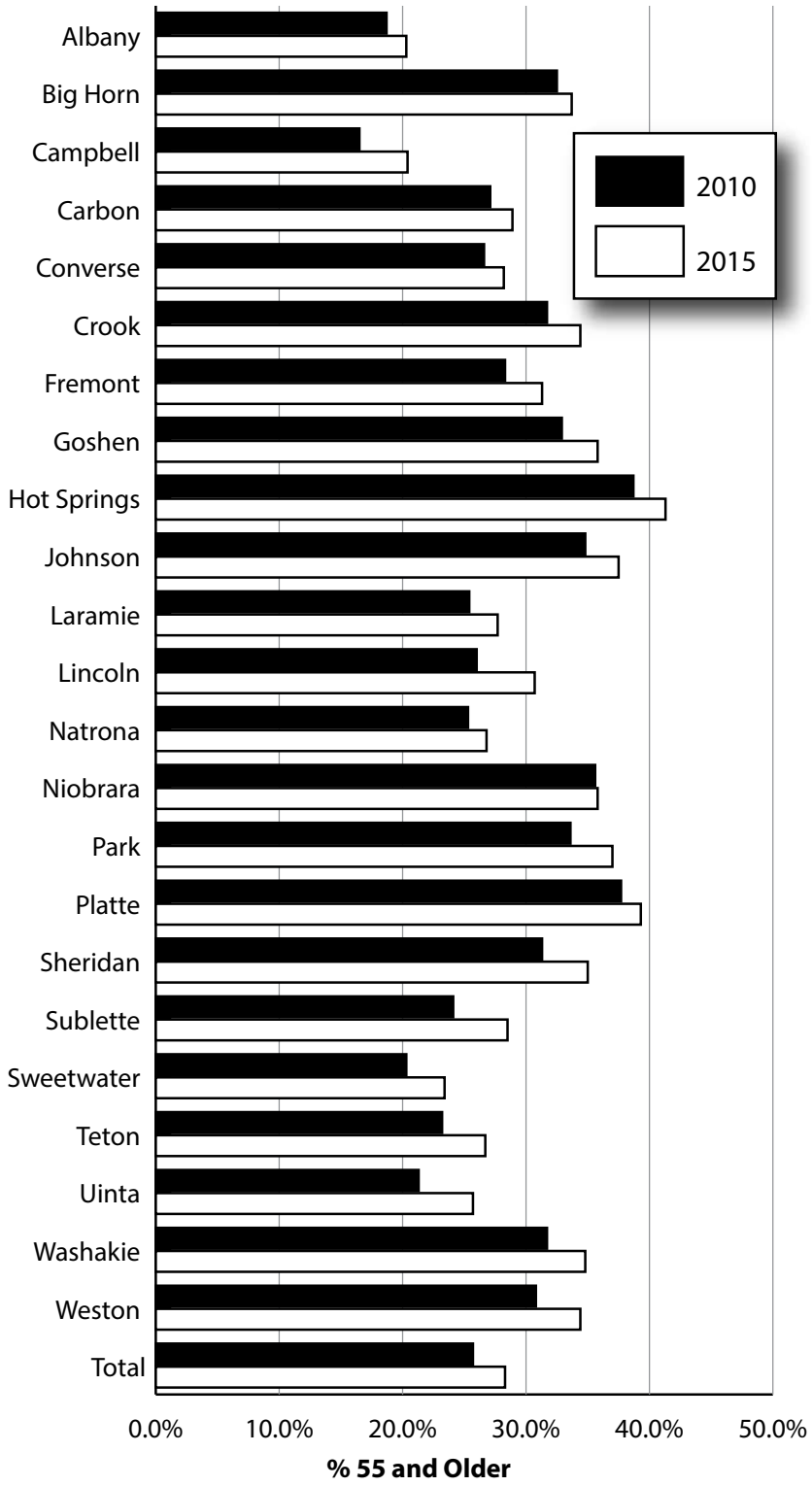
Source: U.S. Census Bureau.
Prepared by L. Knapp, Research & Planning, WY DWS, 1/24/17.

counties. In contrast, by 2015 the proportion of those age 55 or older increased only 1.6 percentage points in Albany County and 1.4 percentage points in Natrona County.

In terms of total change (see Table 2.4, page 20), the number of people ages 55 and older grew at a much greater rate than other age groups from 2010 to 2015 in most counties. The number of people ages 55 and older increased by 31.4% in Campbell County, 24.8% in Teton County, and 22.3% in Lincoln County. In comparison, the increase of people ages 55 and older was relatively low in some counties, including Niobrara County (2.5%). This is possibly because a larger proportion of the population was already in that age group in 2010.

Migration

Migration also has an effect on Wyoming's population. Table 2.5 (see page 21) shows the number and proportion of people who moved into the state during selected years by state of origin. These data are compiled by the Internal Revenue Service (IRS), based on yearly tax returns. During the 2011/2012 tax year, the IRS



Source: U.S. Census Bureau.
Revised by L. Knapp and M. Moore, Research & Planning, WY DWS, 2/21/17.

Figure 2.2: **Percent of Wyoming Population Age 55 Or Older by County of Residence, 2010 and 2015**

changed the way it calculated migrants (Pierce, 2015), so data from 2011/2012 is included in this table as well as data for 2009/2010 and 2014/2015 to show any major differences before and after the implementation of the new methodology. In 2011/2012 there were 30,222 in-migrants and 26,936 out-migrants, leaving a net in-migration of 3,286 people. The largest proportions of in-migrants in 2011/12 moved to Wyoming from Colorado (12.6%), Florida (10.9%), and Utah (7.3%).

In comparison, during 2014/2015, there were 18,277 in-migrants and 18,079 out-migrants, leaving a net in-migration of 198 people. That year, the largest proportions of in-migrants moved to Wyoming from Colorado (14.9%), California (8.1%), and Utah (8.3%).

As previously noted, Wyoming's population is aging in part because of a large baby boom population, but also perhaps because of migration patterns that take younger individuals out of the state for higher education or employment opportunities. Several studies conducted by R&P have found evidence of an exodus of younger workers over time (Holmes, 2015; Glover, 2012; Bullard, et. al., 2009; Jones, 2005). Additionally, there is evidence that workers of all ages have left the state, probably in search of employment due to the state's most recent economic downturn, which occurred between 2015Q2 and 2016Q3 (Moore, 2017).

Table 2.4: **Change in the Resident Wyoming Population Under Age 55 and Ages 55 and Older by County, 2010 to 2015**

	Under 55				55 and Older				Total			
			Change				Change				Change	
County	2010	2015	N	%	2010	2015	N	%	2010	2015	N	%
Albany	29,610	30,236	626	2.1	6,818	7,720	902	13.2	36,428	37,956	1,528	4.2
Big Horn	7,879	7,965	86	1.1	3,793	4,057	264	7.0	11,672	12,022	350	3.0
Campbell	38,594	39,169	575	1.5	7,650	10,051	2,401	31.4	46,244	49,220	2,976	6.4
Carbon	11,550	11,064	-486	-4.2	4,287	4,495	208	4.9	15,837	15,559	-278	-1.8
Converse	10,145	10,216	71	0.7	3,681	4,020	339	9.2	13,826	14,236	410	3.0
Crook	4,857	4,880	23	0.5	2,257	2,564	307	13.6	7,114	7,444	330	4.6
Fremont	28,854	27,706	-1,148	-4.0	11,368	12,609	1,241	10.9	40,222	40,315	93	0.2
Goshen	8,993	8,586	-407	-4.5	4,415	4,797	382	8.7	13,408	13,383	-25	-0.2
Hot Springs	2,951	2,782	-169	-5.7	1,862	1,959	97	5.2	4,813	4,741	-72	-1.5
Johnson	5,594	5,367	-227	-4.1	2,987	3,218	231	7.7	8,581	8,585	4	0.0
Laramie	68,796	70,195	1,399	2.0	23,475	26,926	3,451	14.7	92,271	97,121	4,850	5.3
Lincoln	13,391	12,976	-415	-3.1	4,700	5,746	1,046	22.3	18,091	18,722	631	3.5
Natrona	56,356	60,192	3,836	6.8	19,116	21,986	2,870	15.0	75,472	82,178	6,706	8.9
Niobrara	1,604	1,632	28	1.7	888	910	22	2.5	2,492	2,542	50	2.0
Park	18,775	18,426	-349	-1.9	9,484	10,802	1,318	13.9	28,259	29,228	969	3.4
Platte	5,408	5,353	-55	-1.0	3,270	3,459	189	5.8	8,678	8,812	134	1.5
Sheridan	20,012	19,513	-499	-2.5	9,134	10,496	1,362	14.9	29,146	30,009	863	3.0
Sublette	7,779	7,075	-704	-9.1	2,465	2,824	359	14.6	10,244	9,899	-345	-3.4
Sweetwater	34,724	34,199	-525	-1.5	8,869	10,427	1,558	17.6	43,593	44,626	1,033	2.4
Teton	16,355	16,955	600	3.7	4,942	6,170	1,228	24.8	21,297	23,125	1,828	8.6
Uinta	16,615	15,461	-1,154	-6.9	4,487	5,361	874	19.5	21,102	20,822	-280	-1.3
Washakie	5,837	5,428	-409	-7.0	2,708	2,900	192	7.1	8,545	8,328	-217	-2.5
Weston	4,969	4,744	-225	-4.5	2,212	2,490	278	12.6	7,181	7,234	53	0.7
Total	419,648	420,120	472	0.1	144,868	165,987	21,119	14.6	564,516	586,107	21,591	3.8

Source: U.S. Census Bureau.
Prepared by L. Knapp, Research & Planning, WY DWS, 1/24/17.

Meeting Health Care Needs

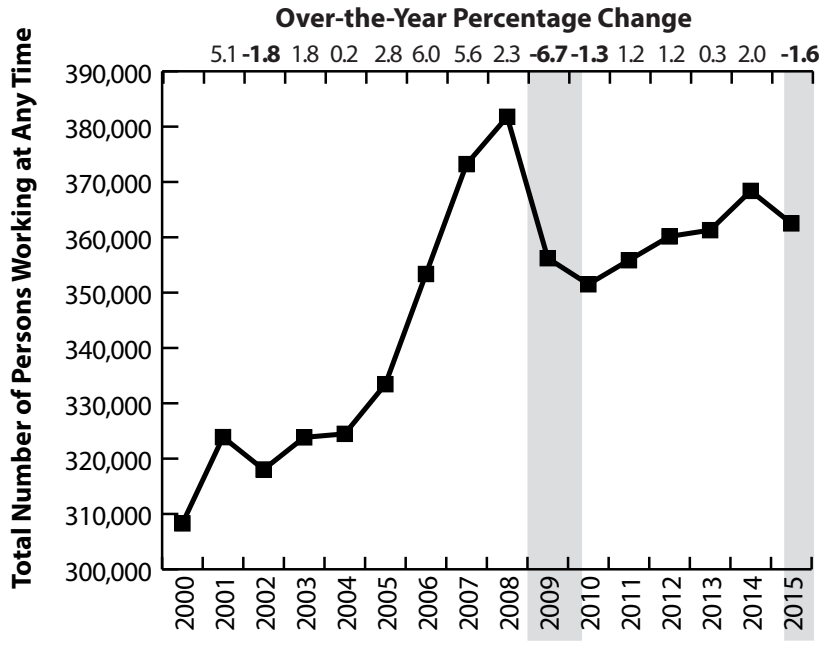
Individuals age 55 or older have a greater likelihood of having chronic health conditions requiring medical attention compared to the younger population (National Center for Health Statistics, 2014). In fact, more than 90% of older adults reported having at least one chronic disease in 2008 (Dall, et al., 2013). Chronic ailments include cancers, heart disease, stroke, diabetes, and Alzheimer's disease (U.S. Department of Health and Human Services, n.d.). Older adults are also more likely to suffer medical emergencies such as falls (U.S. Department of Health and Human Services, n.d.). An increase in the number of older adults puts pressure on the health care delivery system both because of the need for more trained professionals to provide care, and because a substantial proportion of the current health care workforce is also aging and nearing traditional retirement age (National Center for Health Workforce Analysis, 2006; Harrington & Heidkamp, 2013).

Older individuals use medical services such as ambulatory care, hospitals, skilled nursing facilities, and home health care at

Table 2.5: Number and Percent of In-Migrants to Wyoming by State of Origin, 2009/10, 2011/12, and 2014/15

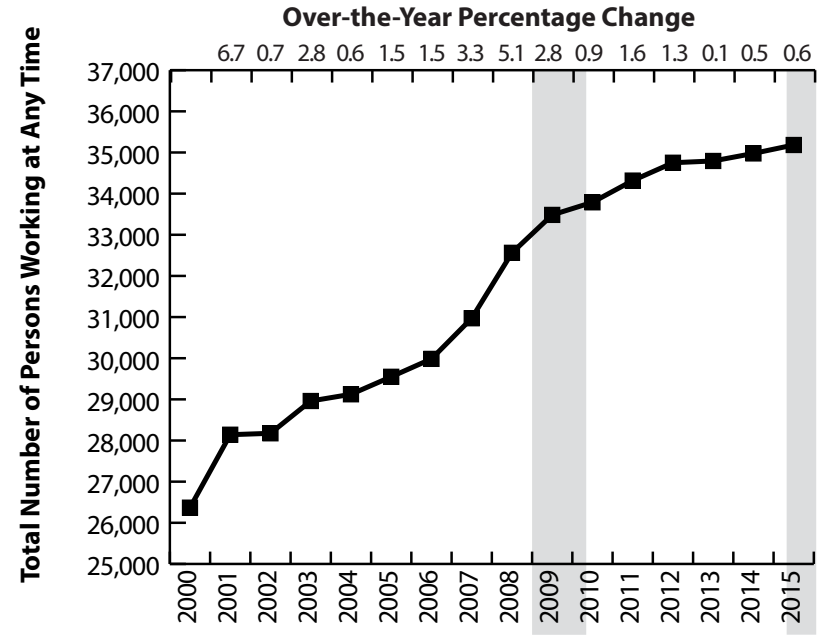
State of Origin	2009-2010 N	2009-2010 Column %	2011-2012 N	2011-2012 Column %	2014-2015 N	2014-2015 Column %
Alabama	101	0.5	220	0.7	112	0.6
Alaska	195	0.9	327	1.1	161	0.9
Arizona	1,057	4.8	1,104	3.7	686	3.8
Arkansas	164	0.7	220	0.7	179	1.0
California	1,341	6.0	1,830	6.1	1,483	8.1
Colorado	3,167	14.3	3,802	12.6	2,732	14.9
Connecticut	58	0.3	78	0.3	57	0.3
Delaware	28	0.1	46	0.2	N/D	N/D
District Of Columbia	20	0.1	30	0.1	N/D	N/D
Florida	679	3.1	3,289	10.9	454	2.5
Foreign	385	1.7	406	1.3	368	2.0
Georgia	258	1.2	573	1.9	231	1.3
Hawaii	100	0.5	114	0.4	82	0.4
Idaho	1,011	4.6	1,447	4.8	858	4.7
Illinois	388	1.7	395	1.3	275	1.5
Indiana	185	0.8	262	0.9	144	0.8
Iowa	267	1.2	271	0.9	140	0.8
Kansas	263	1.2	382	1.3	209	1.1
Kentucky	110	0.5	152	0.5	71	0.4
Louisiana	154	0.7	218	0.7	112	0.6
Maine	49	0.2	72	0.2	49	0.3
Maryland	137	0.6	140	0.5	105	0.6
Massachusetts	69	0.3	155	0.5	106	0.6
Michigan	799	3.6	559	1.8	265	1.4
Minnesota	421	1.9	330	1.1	199	1.1
Mississippi	94	0.4	114	0.4	89	0.5
Missouri	326	1.5	451	1.5	254	1.4
Montana	1,240	5.6	1,439	4.8	966	5.3
Nebraska	756	3.4	921	3.0	565	3.1
Nevada	557	2.5	686	2.3	417	2.3
New Hampshire	39	0.2	62	0.2	37	0.2
New Jersey	70	0.3	106	0.4	61	0.3
New Mexico	282	1.3	433	1.4	345	1.9
New York	217	1.0	357	1.2	214	1.2
North Carolina	319	1.4	360	1.2	219	1.2
North Dakota	237	1.1	418	1.4	465	2.5
Ohio	285	1.3	303	1.0	227	1.2
Oklahoma	279	1.3	379	1.3	279	1.5
Oregon	441	2.0	640	2.1	313	1.7
Pennsylvania	215	1.0	400	1.3	227	1.2
Rhode Island	26	0.1	26	0.1	N/D	N/D
South Carolina	135	0.6	142	0.5	102	0.6
South Dakota	774	3.5	919	3.0	581	3.2
Tennessee	198	0.9	198	0.7	146	0.8
Texas	1,138	5.1	1,599	5.3	1,139	6.2
Utah	1,747	7.9	2,209	7.3	1,514	8.3
Vermont	47	0.2	43	0.1	35	0.2
Virginia	246	1.1	345	1.1	200	1.1
Washington	834	3.8	861	2.8	533	2.9
West Virginia	48	0.2	65	0.2	79	0.4
Wisconsin	217	1.0	324	1.1	192	1.1
Total In-Migrants	22,173	100.0	30,222	100.0	18,277	100.0
Total Out-Migrants	23,118		26,936		18,079	
Net In-Migration	-945		3,286		198	

N/D = Not discloseable. Data have been suppressed to prevent disclosure.
Source: U.S. Internal Revenue Service (IRS) Migration Data.
Prepared by L. Knapp, Research & Planning, WY DWS,11/18/16.



Shaded areas represent periods of economic downturn: 2009Q1-2010Q1 and 2015Q2-2016Q3.
Source: Wage Records database.
Prepared by M. Moore, Research & Planning, WY DWS, 11/17/2016.

Figure 2.3: **Total Number of Persons Working in Wyoming at Any Time and Over-the-Year Percentage Change, 2000-2015**



Shaded areas represent periods of economic downturn: 2009Q1-2010Q1 and 2015Q2-201Q3.
Source: Wage Records database.
Prepared by M. Moore, Research & Planning, WY DWS, 11/17/2016.

Figure 2.4: **Total Number of Persons Working in Health Care & Social Assistance in Wyoming at Any Time and Over-the-Year Percentage Change, 2000-2015**

a much greater rate than younger people (Center for Health Workforce Studies, 2006). Primary care physicians tend to be the initial point of care for this population, but the number of primary care physicians in the United States has been declining as medical students choose to specialize in areas of medicine with higher wages (Alliance for Health Reform, 2011). Also, the number of physicians with experience and training in geriatrics is much smaller than will be needed for an aging population (Population Reference Bureau, 2010).

A shortage of nurses, particularly those trained in geriatric medicine, is projected within the next decade. Although there is a substantial supply of nursing applicants, nursing schools do not have the space or faculty to educate them all (Population Reference Bureau, 2010). Similarly, the demand for direct care workers such as home health aides, certified nursing assistants, and medical assistants is expected to increase in the near future as older populations increase their use of home health care, assisted living facilities, and skilled nursing facilities (Population Reference Bureau, 2010).

Wyoming Employment

As shown in Figure 2.3 (see page 22), the total number of people working in Wyoming generally increased between 2000 and 2008, but decreased substantially during the previous economic downturn (2009Q1-2010Q1) before starting to increase again. Employment dropped again after 2014 during the most recent economic downturn (2015Q2-2016Q3). However, as shown in Figure 2.4 (see page 22), employment in the health care and social assistance industry (NAICS 62) has increased every year since 2000. This sector includes ambulatory care, hospitals, skilled nursing facilities, individual and family services, vocational rehabilitation, and child day care services. The continued employment growth in this industry, especially compared to the history of job losses related to economic downturns in other industries, indicates that the need for health care workers continues to grow.

Tables 2.6 and 2.7 (see pages 24 and 25) contain the number and percent of Wyoming workers by selected age group, county, and substate region in 2010 and 2015. Figure 2.5 (see page 26) is a map of Wyoming's substate regions. In Tables 2.6 and 2.7, workers are split into two groups: those younger than age 55 and those who were age 55 or older, in order to show the number and proportion of the population that will need to be replaced by younger workers as they retire and leave the workforce. Overall, the proportion of workers age 55 or older increased from 15.6% in 2010 to 17.3% in 2015. All counties except Platte County experienced growth in the proportion of workers age 55 or older. Weston County had the largest increase (20.3% to 24.2%), which is expected considering the average age of Weston County's population was among the oldest in the state in 2010 at 43.6 years (Glover, et al., 2011); the population of Weston County has continued to age over the past five years. In comparison, counties like Albany County (14.5% to 14.9%) and Teton County (9.3% to 10.1%) had very little growth in the proportion of older workers from 2010 to 2015.

Moore (2017) found that, during the most recent economic downturn, the mining industry lost jobs at a much higher rate than other industries, and there was a corresponding drop in the number of persons in Wyoming's resident labor force[2]. This decline may indicate that people may have left the state when they were unable to find work. Counties with high concentrations of mining employment lost the largest number of total workers between 2010 and 2015, including Sublette County (-1,273) and Campbell County (-837; see Tables 2.6 and 2.7). Both of these counties also had the largest increase in proportion of workers age 55 or older, probably due to younger workers migrating away in search of better employment opportunities. This departure of younger workers leaves behind the older workers who may retire in the next decade and will also require more health care. The proportion of workers age 55 and older in Sublette County increased from 13.1% in 2010 to 16.5% in 2015; in Campbell County, the proportion of older workers increased from 13.5% to 16.7%.

Although employment in the health care industry continued to increase between 2010 and 2015, the age of workers within that industry also increased. As shown in Table 2.8 (see page 26), the percentage of those age 55 or older

2 The *labor force* is defined as the total number of the civilian non-institutionalized population age 16 or older who are employed or unemployed (jobless, looking for a job, and available for work).

increased by 12.0% from 2010 to 2015, while the percentage of workers ages 19 and younger decreased by 19.3%, those ages 20-24 only increased by 0.6%, and those ages 25-34 increased by 7.6%. Research & Planning has access to data from the state's licensing boards and is therefore able to calculate the average age for workers in several health care occupations. See Chapter 3 of this publication for the results of that analysis.

Health Insurance

People ages 65 and older, and those with permanent disabilities, are eligible for Medicare, a federal insurance program that covers hospital and physician care,

Table 2.6: Total Number of Persons Working in Wyoming at Any Time by County of Employment and Age Group, 2010

County of Employment	Younger than 55		55 and Older		Nonresidents[a]		Total	
	N	Row %	N	Row %	N	Row %	N	Row %
Northwest Region	**32,390**	**63.7**	**9,716**	**19.1**	**8,776**	**17.2**	**50,882**	**100.0**
Big Horn	3,324	59.0	1,077	19.1	1,237	21.9	5,638	100.0
Fremont	14,150	65.3	3,854	17.8	3,679	17.0	21,683	100.0
Hot Springs	1,651	65.4	589	23.3	283	11.2	2,523	100.0
Park	10,208	62.4	3,162	19.3	2,999	18.3	16,369	100.0
Washakie	3,057	65.5	1,034	22.1	578	12.4	4,669	100.0
Northeast Region	**40,980**	**67.2**	**9,657**	**15.8**	**10,374**	**17.0**	**61,011**	**100.0**
Campbell	24,569	68.6	4,822	13.5	6,421	17.9	35,812	100.0
Crook	1,747	63.0	537	19.4	489	17.6	2,773	100.0
Johnson	2,685	63.5	861	20.3	685	16.2	4,231	100.0
Sheridan	10,021	66.0	2,825	18.6	2,327	15.3	15,173	100.0
Weston	1,958	64.8	612	20.3	452	15.0	3,022	100.0
Southwest Region	**48,608**	**59.8**	**10,774**	**13.3**	**21,883**	**26.9**	**81,265**	**100.0**
Lincoln	4,802	62.9	1,325	17.4	1,506	19.7	7,633	100.0
Sublette	4,057	57.1	928	13.1	2,120	29.8	7,105	100.0
Sweetwater	20,371	69.4	4,569	15.6	4,405	15.0	29,345	100.0
Teton	11,475	46.1	2,313	9.3	11,118	44.6	24,906	100.0
Uinta	7,903	64.4	1,639	13.4	2,734	22.3	12,276	100.0
Southeast Region	**58,136**	**69.9**	**13,600**	**16.4**	**11,389**	**13.7**	**83,125**	**100.0**
Albany	13,793	68.7	2,902	14.5	3,371	16.8	20,066	100.0
Goshen	3,840	69.1	1,200	21.6	514	9.3	5,554	100.0
Laramie	36,948	71.2	8,242	15.9	6,667	12.9	51,857	100.0
Niobrara	698	66.5	250	23.8	101	9.6	1,049	100.0
Platte	2,857	62.1	1,006	21.9	736	16.0	4,599	100.0
Central Region	**43,930**	**67.9**	**10,229**	**15.8**	**10,494**	**16.2**	**64,653**	**100.0**
Carbon	6,087	59.9	1,605	15.8	2,472	24.3	10,164	100.0
Converse	4,654	69.2	1,119	16.6	949	14.1	6,722	100.0
Natrona	33,189	69.5	7,505	15.7	7,073	14.8	47,767	100.0
Unspecified	**3,903**	**36.9**	**890**	**8.4**	**5,780**	**54.7**	**10,573**	**100.0**
Total	**227,947**	**64.8**	**54,866**	**15.6**	**68,696**	**19.5**	**351,509**	**100.0**

[a]Nonresidents are individuals for whom demographic data are not available.

Source: Employment and Earnings by Industry, County, Age, & Gender, 2000-2015 (http://doe.state.wy.us/LMI/earnings_tables/2016/Index.htm).

Units of measurement: Wage Records linked to Driver's License File.

Prepared by L. Knapp, Research & Planning, WY DWS, 2/21/17.

as well as prescription drugs and other services (Cubanski & Neuman, 2016). In 2015, Medicare spending constituted 15% of the federal budget (Cubanski & Neuman, 2016), and 20% of the National Health Expenditure budget (U.S. Centers for Medicare and Medicaid, 2016). Medicare coverage is broken into several parts; Part A covers services such as hospitals, skilled nursing care, hospice, and home health care, and Part B covers medically necessary services and preventative care. People who are enrolled in Medicare Parts A and B are also eligible for Medicare Advantage programs, also referred to as Medicare fee for service programs, which are private insurance plans that offer further medical, vision, dental, and hearing coverage (U.S. Centers for Medicare and Medicaid Services, N.D.).

Table 2.7: **Total Number of Persons Working in Wyoming at Any Time by County of Employment and Age Group, 2015**

	Younger than 55		55 and Older		Nonresidents[a]		Total	
County of Employment	N	Row %	N	Row %	N	Row %	N	Row %
Northwest Region	**30,866**	**60.5**	**10,792**	**21.1**	**9,376**	**18.4**	**51,034**	**100.0**
Big Horn	3,325	58.3	1,179	20.7	1,202	21.1	5,706	100.0
Fremont	13,283	61.9	4,187	19.5	4,001	18.6	21,471	100.0
Hot Springs	1,524	63.2	618	25.6	269	11.2	2,411	100.0
Park	9,967	58.6	3,713	21.8	3,339	19.6	17,019	100.0
Washakie	2,767	62.5	1,095	24.7	565	12.8	4,427	100.0
Northeast Region	**39,468**	**65.4**	**11,183**	**18.5**	**9,733**	**16.1**	**60,384**	**100.0**
Campbell	23,557	67.4	5,855	16.7	5,563	15.9	34,975	100.0
Crook	1,606	55.5	593	20.5	697	24.1	2,896	100.0
Johnson	2,381	61.5	817	21.1	674	17.4	3,872	100.0
Sheridan	10,037	63.9	3,211	20.4	2,471	15.7	15,719	100.0
Weston	1,887	64.6	707	24.2	328	11.2	2,922	100.0
Southwest Region	**45,673**	**54.9**	**12,304**	**14.8**	**25,169**	**30.3**	**83,146**	**100.0**
Lincoln	4,540	61.2	1,457	19.6	1,423	19.2	7,420	100.0
Sublette	3,339	57.3	962	16.5	1,531	26.3	5,832	100.0
Sweetwater	19,328	64.8	5,135	17.2	5,358	18.0	29,821	100.0
Teton	11,343	40.1	2,848	10.1	14,112	49.9	28,303	100.0
Uinta	7,123	60.5	1,902	16.2	2,745	23.3	11,770	100.0
Southeast Region	**59,135**	**66.3**	**15,451**	**17.3**	**14,584**	**16.4**	**89,170**	**100.0**
Albany	13,643	65.7	3,099	14.9	4,025	19.4	20,767	100.0
Goshen	3,662	65.3	1,285	22.9	663	11.8	5,610	100.0
Laramie	38,356	67.8	9,736	17.2	8,469	15.0	56,561	100.0
Niobrara	678	62.9	282	26.2	118	10.9	1,078	100.0
Platte	2,796	54.2	1,049	20.4	1,309	25.4	5,154	100.0
Central Region	**45,430**	**64.4**	**12,026**	**17.0**	**13,098**	**18.6**	**70,554**	**100.0**
Carbon	5,837	54.1	1,780	16.5	3,175	29.4	10,792	100.0
Converse	5,041	61.4	1,444	17.6	1,728	21.0	8,213	100.0
Natrona	34,552	67.0	8,802	17.1	8,195	15.9	51,549	100.0
Unspecified	**3,648**	**44.3**	**877**	**10.7**	**3,701**	**45.0**	**8,226**	**100.0**
Total	**224,220**	**61.9**	**62,633**	**17.3**	**75,661**	**20.9**	**362,514**	**100.0**

[a]Nonresidents are individuals for whom demographic data are not available.

Source: Employment and Earnings by Industry, County, Age, & Gender, 2000-2015 (http://doe.state.wy.us/LMI/earnings_tables/2016/Index.htm).

Units of measurement: Wage Records linked to Driver's License File.

Prepared by L. Knapp, Research & Planning, WY DWS, 2/21/17.

Between 2010 and 2014 (the most current data available) the number of people in Wyoming who were enrolled in Medicare Parts A and B increased by 14.2% (see Table 2.9, page 27). This is a slightly larger increase than the national average, where the number of enrollees increased by 13.4%. The number of people in the state who also enrolled in a fee for service plan increased by 17.9% compared to an increase of 3.2% nationally. The total standardized cost for Medicare services increased by 16.0% in Wyoming during this period, but the standardized per capita costs decreased by 1.6%. In comparison, nationally the total costs increased by 2.9% and per capita costs decreased by 0.3%.

In addition to Medicare, federal funding also helps provide programs such as Medicaid and Children's Health Insurance Program (CHIP). Medicaid is a program designed to provide health care to several mandatory eligibility groups, including low income families, qualified pregnant women, and people receiving Supplemental Security Income (U.S. Centers for Medicare and Medicaid). Although the ACA provided a means to expand Medicaid coverage, the state of Wyoming chose not to do so. CHIP is a program funded by both state and federal monies and provides affordable health care coverage to children in families whose income

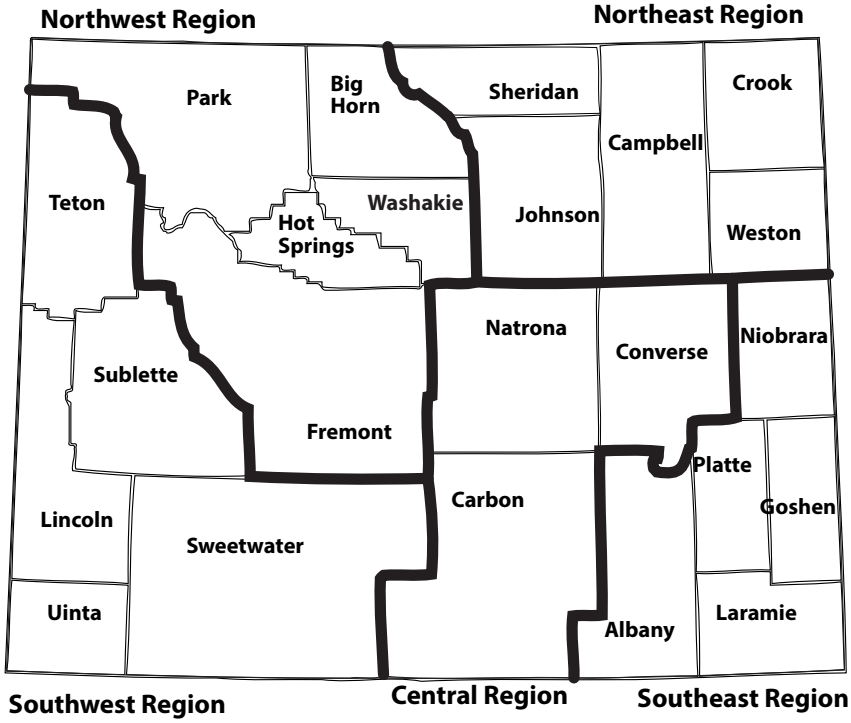


Figure 2.5: **Map of Wyoming with Counties and Substate Regions**

Table 2.8: **Number of Individuals Working in Health Care & Social Assistance (NAICS[a] 62) in Wyoming by Age, 2010 and 2015**

	2010		2015		Change, 2010-2015	
Age Group	N	Column %	N	Column %	N	%
19 & Younger	1,195	3.5	964	2.7	-231	-19.3
20-24	3,480	10.3	3,500	9.9	20	0.6
25-34	7,479	22.1	8,051	22.9	572	7.6
35-44	6,084	18.0	6,493	18.5	409	6.7
45-54	6,286	18.6	5,747	16.3	-539	-8.6
55 & Older	6,301	18.6	7,056	20.1	755	12.0
Nonresidents[b]	2,964	8.8	3,371	9.6	407	13.7
Total	**33,789**	**100.0**	**35,182**	**100.0**	**1,393**	**4.1**

[a]North American Industry Classification System.

[b]Nonresidents are individuals for whom demographic data are not available.

Source: Employment and Earnings by Industry, County, Age, & Gender, 2000-2015 (http://doe.state.wy.us/LMI/earnings_tables/2016/Index.htm).

Units of measurement: Wage Records linked to Driver's License File.

Prepared by M. Moore, Research & Planning, WY DWS, 2/21/17.

is within 200% of the federal poverty line but are not eligible for Medicaid (Wyoming Department of Health, n.d.). Until October 2016, CHIP was 65% funded by the federal government and 35% funded by the state. After October 2016, this changed to 88% federal funding and 12% state funding, but this could change in the future (Scott, 2017a).

Between 2010 and 2015, Medicaid enrollment increased by 4.5% (see Table 2.10, page 28). Total Medicaid expenditures during this time increased by 2.5%. More than half of all Medicaid expenditures in 2015 were medical costs (56.0%) and 40.0% were long term care costs (see Figure 2.6, page 28). In comparison, CHIP participation dropped between 2010 and 2015. As shown in Table 2.11 (see page 28), the average number of children continuously enrolled in CHIP each month decreased by 44.7% between 2010 and 2015 and the total annual unique enrollments decreased by 16.4% (Scott, 2017b). This drop is due to both changes in the way the CHIP program was implemented as the state streamlined the CHIP and Medicaid application systems, and a mandatory transfer of 1,250 children to Medicaid based on adjusted income guidelines (Scott, 2017a).

People who are younger than age 65 and not eligible for Medicaid generally rely on either employer-provided insurance or privately purchased insurance to cover the costs of their health care needs. Access to health insurance has a significant effect on an individual's ability to obtain medical care in the United States. Without some form of insurance, costs can quickly become prohibitive depending on the type of medical care being sought (Institute of Medicine, 2009). Individuals who do not have some form of medical insurance generally have less access to health care and are more likely to go without care, even when they need it (Kaiser Family Foundation, 2016).

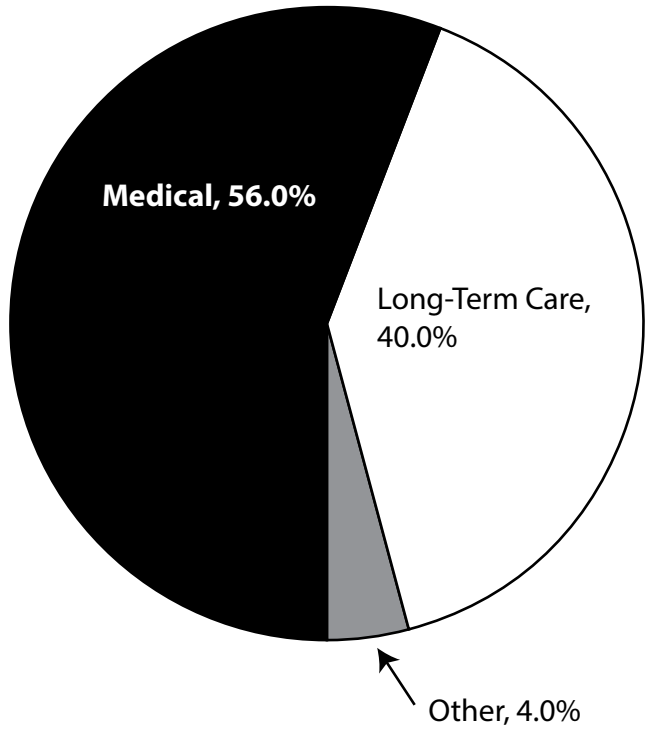
In 2010, the Patient Protection and Affordable Care Act (ACA) was enacted. In addition to increasing patient protections, this legislation expanded access to insurance through mandated employer coverage, statewide insurance exchanges, and income based subsidies to make insurance options more affordable to a larger proportion of the population

Table 2.9: Selected Statistics of Medicare Beneficiaries in Wyoming and Nationally, 2010-2014

	Wyoming			United States		
	2010	2014	% Change	2010	2014	% Change
Beneficiaries with Part A and Part B	78,573	89,707	14.2	45,541,204	51,627,310	13.4
Medicare Fee For Service Beneficiaries	72,714	85,729	17.9	33,041,639	34,096,898	3.2
Average Age	72	72		71	71	
Percent Male	46.9	47.5		44.5	45.4	
Percent Non-Hispanic White	93.4	92.3		80.8	79.9	
Percent Eligible for Medicaid	14.1	13.6		21.6	20.7	
Total Standardized Costs	$518,002,554	$600,879,666	16.0	$297,169,216,329	$305,850,650,241	2.9
Standardized Per Capita Costs	$7,124	$7,009	-1.6	8,994	8,970	-0.3

Source: Centers For Medicare and Medicaid Services.
Prepared by L. Knapp, Research & Planning, WY DWS, 2/17/17.

(National Conference of State Legislatures, 2011). Nationally, the proportion of uninsured persons decreased from 18.2% in 2010 to 10.5% in 2015 (Kaiser Family Foundation, 2016). In Wyoming, the number of people who enrolled in a plan from the ACA marketplace increased every year since the legislation took effect (Chilton, 2015), and by 2016 23,770 people had enrolled, with the majority living in non-metropolitan areas (Barker, et al., 2017). However, laws regarding the ACA and health care access could change in the next years with the new federal administration.



Source: Wyoming Department of Health, WY Medicaid Annual Report SFY 2015.
Prepared by L. Knapp, Research & Planning, WY DWS, 3/2/17.

Figure 2.6: **Wyoming Medicare Service Utilization by Expenditure, 2015**

Table 2.10: **Medicaid Enrollment and Expenditures for Wyoming, 2010 and 2015**

	2010	2015	% Change
Enrollment	85,416	89,252	4.5
Expenditures	$514,529,323	$527,531,608	2.5

Source: Wyoming Department of Health, WY Medicaid Annual Report SFY 2015.
Prepared by L. Knapp, Research & Planning, WY DWS, 3/2/17.

Table 2.11: **Wyoming CHIP Enrollment, 2010 and 2015**

	2010	2015	% Change
Average Monthly Enrollment	5,409	2,989	-44.7
Annual Unique Enrollment	8,871	7,418	-16.4

Source: Wyoming Department of Health, Kid Care CHIP (Personal communication with Susie Scott, January 20, 2016).
Prepared by L. Knapp, Research & Planning, WY DWS, 3/1/17.

R&P collects survey data on a quarterly basis from state employers regarding whether or not they offer selected benefits. The survey methodology and past issues of the yearly data analysis can be found at http://doe.state.wy.us/LMI/benefits.htm. As shown in Figure 2.7 (see page 29), the proportion of total jobs that offered selected types of health insurance remained stable between 2010Q1 and 2015Q4. Approximately two-thirds of jobs offered medical insurance. Slightly fewer jobs were offered dependent medical insurance, although that proportion was still more than 60% each quarter. More than half of all jobs were offered dental insurance and at least 40% of all jobs were offered vision insurance.

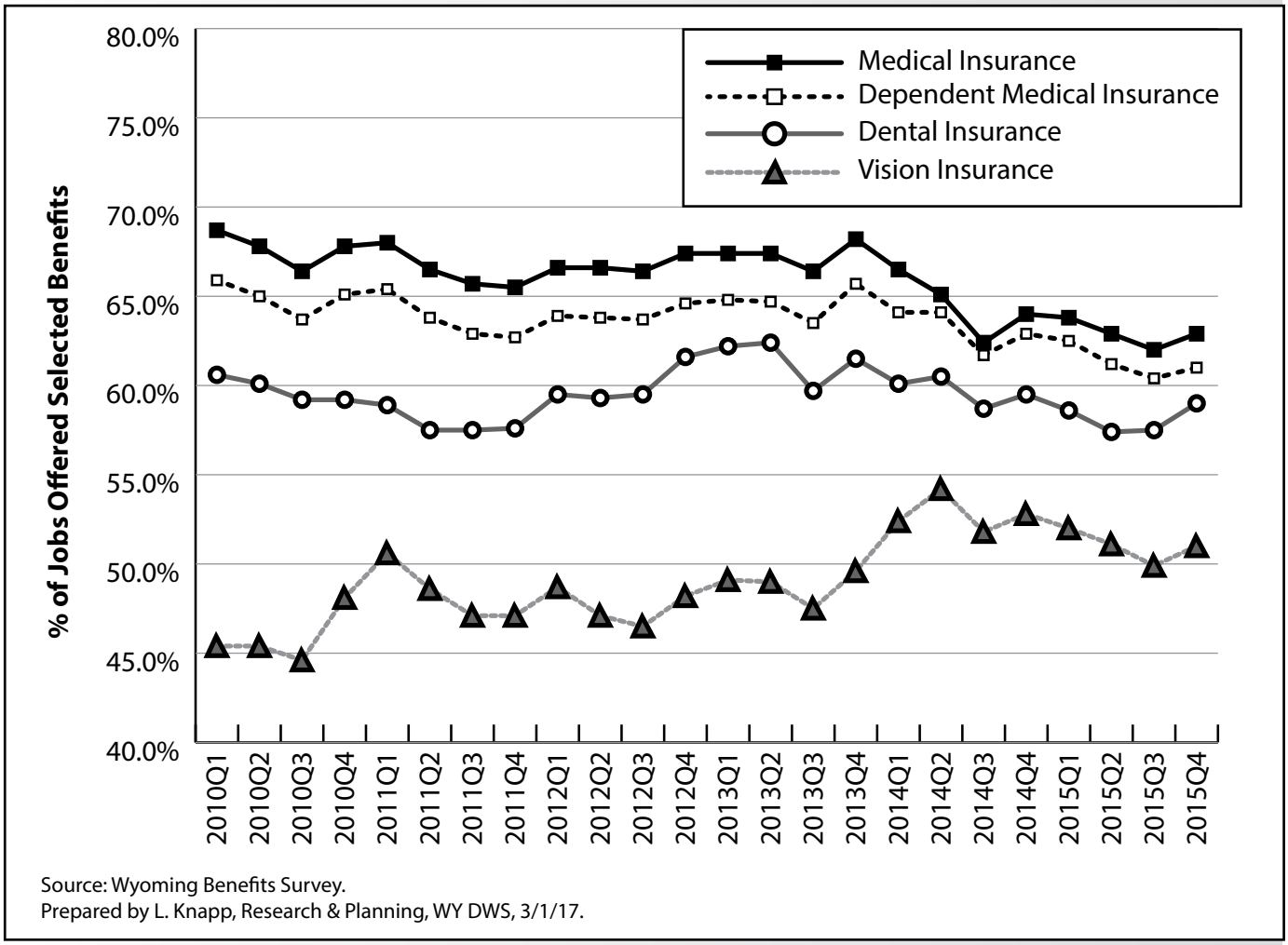
A larger proportion of

full-time jobs were offered selected benefits during this period compared to part-time jobs. As shown in Figure 2.8 (see page 30), four out of every five full-time jobs offered medical insurance, although that proportion began to decrease after 2013Q4. More than 75% of full-time jobs offered dependent medical insurance and nearly as many were offered dental insurance. Around half of all full-time jobs offered vision insurance, but that proportion increased over time so that two-thirds of those jobs offered the benefit after 2014Q1.

As shown in Figure 2.9 (see page 31), a much smaller proportion of part-time jobs offered selected benefits between 2010Q1 and 2015Q4, and that proportion generally decreased over time for all benefits. In 2010Q1, approximately one in five part-time jobs offered medical insurance but that dropped to 15.2% in 2015Q4. This decline happened for the proportion offered dependent medical insurance and dental insurance as well.

Conclusions

Compared to employment in all industries, employment in Wyoming's health care industry has steadily increased



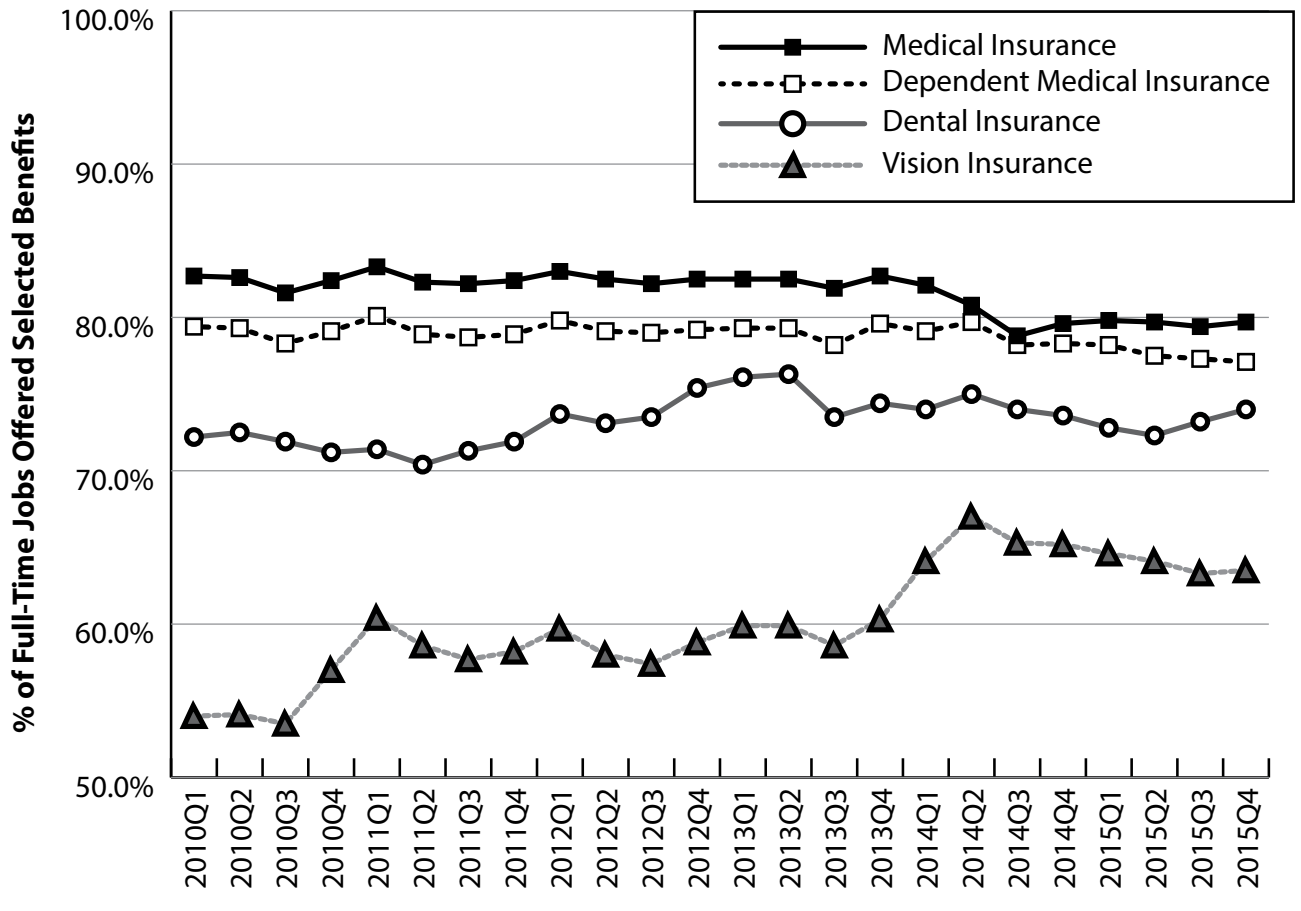
Source: Wyoming Benefits Survey.
Prepared by L. Knapp, Research & Planning, WY DWS, 3/1/17.

Figure 2.7: **Percent of Total Jobs Offered Selected Benefits in Wyoming, 2010Q1 to 2015Q4**

since 2000. The reasons for this are two-fold: Wyoming's population is aging and medical spending has increased, especially publically-funded medical spending.

Evidence shows that older people generally need more medical care than younger individuals. Among other things, older populations are more likely to suffer from one or more chronic health conditions, such as cancer, Alzheimer's disease, heart disease, and diabetes, which need regular medical supervision or intervention. Wyoming's population has continued to age since 2010, due in part to a large baby boom population and in part to an out-migration of younger workers looking for better economic opportunities after the most recent economic downturn. The distribution of this aging population, however, varies by county. Some counties have a much larger population of people age 55 or older than others, and some counties have experienced larger increases in the proportion of older people over the last five years. This overall aging of the state's population will continue to have an effect on health care employment in the future as more and more people need specialized attention.

Health insurance, especially from publically-funded sources, is also driving

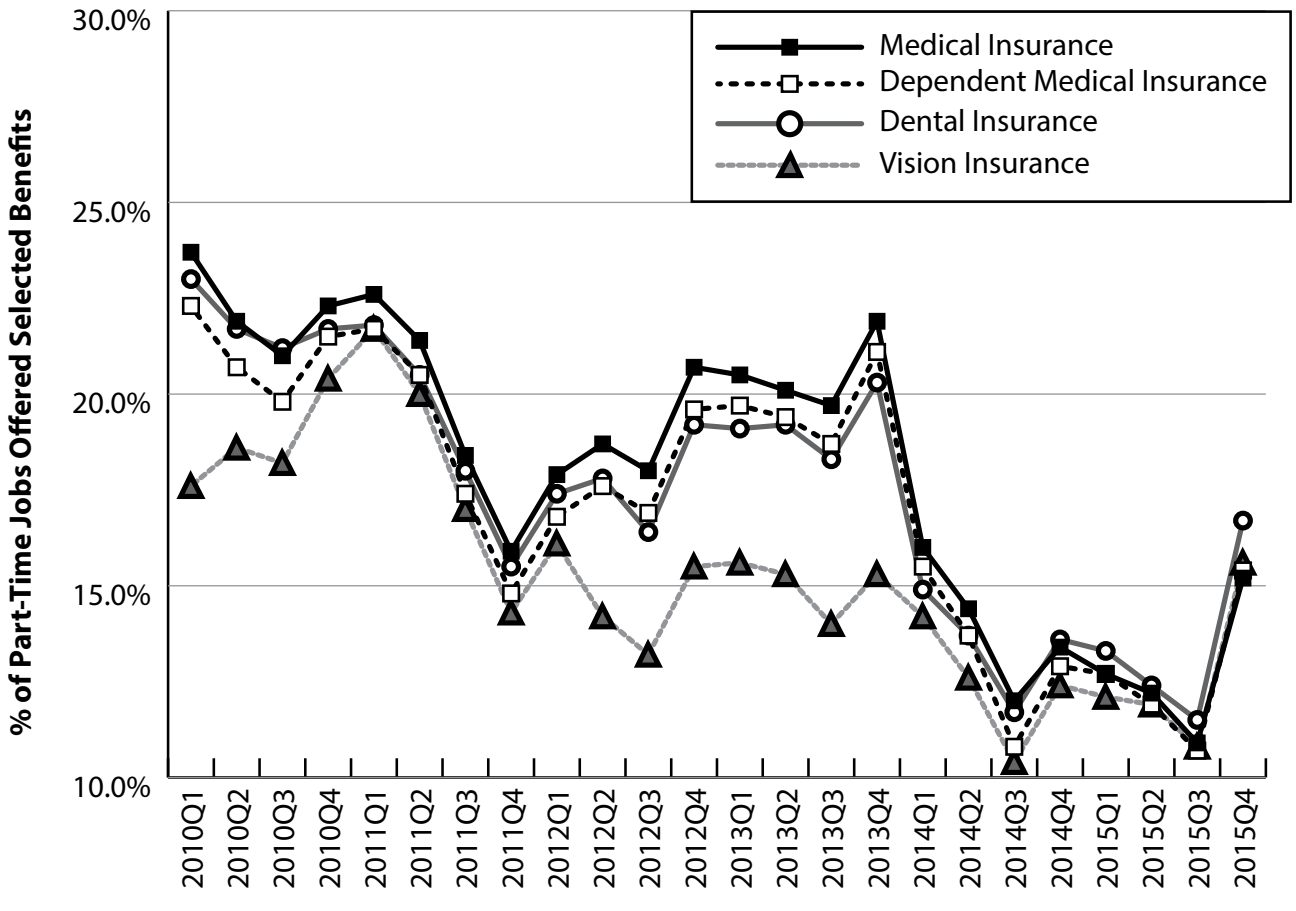


Source: Wyoming Benefits Survey.
Prepared by L. Knapp, Research & Planning, WY DWS, 3/1/17.

Figure 2.8: **Percent of Full-Time Jobs Offered Selected Benefits in Wyoming, 2010Q1 to 2015Q4**

health care employment in Wyoming. Medicare spending, which is tied to age, has increased substantially in the past five years, and will continue to do so as more people become old enough to enroll. People who are not old enough to qualify for Medicare often rely on employer-provided insurance or private insurance. The ACA was passed in order to make private insurance affordable to a greater number of people; while the future of the ACA is in question, the proportion of jobs offering health insurance by their employers has remained stable over time. Studies have shown that people who do not have health care insurance do not always seek medical care when they need it, so it stands to reason that those with health insurance would utilize medical services more often.

An aging health care workforce will lead to some issues in the near future. Similar to the general population, health care workers in Wyoming are aging and many will reach typical retirement age in the next decade. Because of this, there will be increased need for trained replacement workers. Also, there is a shortage nationally, and most likely locally, of health care professionals who are trained specifically in the needs of geriatric populations. This type of training will



Source: Wyoming Benefits Survey.
Prepared by L. Knapp, Research & Planning, WY DWS, 3/1/17.

Figure 2.9: **Percent of Part-Time Jobs Offered Selected Benefits in Wyoming, 2010Q1 to 2015Q4**

become increasingly important as larger numbers of older individuals seek medical care.

Lack of state or federal funding may impede health care employment growth Seventy percent of Wyoming's revenue comes from severance taxes and royalty fees on mineral extraction, and with the most recent economic downturn affecting primarily the mining industry, tax revenues have also been impacted (Richardson, 2017). Due to diminished tax revenues, large funding cuts have already been made to state agencies that are dependent on state money (as opposed to federal funds), including the Wyoming Department of Health. Funding cuts to this department in 2016 were expected to impact more than 600 private sector jobs, including health care jobs (Murphy, 2016). Similarly, in terms of federal monies, it is possible that programs such as the ACA, Medicare, Medicaid, and CHIP could be cut or modified, which could affect the amount of money flowing into the state's health care industry and the people employed there.

References

Alliance for Health Reform (2011, April). Health care workforce: Future supply vs. demand. Retrieved February 15, 2017, from http://www.allhealth.org/publications/Medicare/Health_Care_Workforce_104.pdf

Bullard, D., Ellsworth, P., Jones, S. D., Knapp, L., Leonard, D. W., & Saulcy, S. (2009). *Wyoming Workforce Annual Report 2009*. Casper, WY: Research & Planning. Retrieved February 13, 2017, from http://doe.state.wy.us/lmi/annual_report_09.pdf

Center for Health Workforce Studies. (2006, March). The impact of the aging population on the health workforce in the United States: Summary of key findings. Retrieved February 15, 2017, from http://www.albany.edu/news/pdf_files/impact_of_aging_full.pdf

Chilton, J. (2015, February 17). Wyoming's ACA enrollment comes in above expectations. *Wyoming Tribune Eagle*. Retrieved February 17, 2017, from http://www.wyomingnews.com/news/wyoming-s-aca-enrollment-comes-in-above-expectations/article_8b26a9ee-69d4-5946-a6c2-93c0c0b8c4b2.html

Colby, S. L., & Ortman, J. M. (2014). The Baby Boom cohort in the United States: 2012-2060. Current Population Reports, 25-1141. U.S. Census Bureau: Washington D.C. Retrieved February 13, 2017, from https://www.census.gov/prod/2014pubs/p25-1141.pdf

Cubanski, J., and Neuman, T. (2016, July). Facts on Medicare spending and financing. Kaiser Family Foundation: CA. Retrieved February 27, 2017, from http://kff.org/medicare/issue-brief/the-facts-on-medicare-spending-and-financing/

Dall, T. M., Gallo, P. D., Chakrabarti, R., West, T., Semilla, A. P., Storm, M. V. (2013, November). An aging population and growing disease burden will require a large and specialized health care workforce by 2025. *Health Affairs, 32*(11). Retrieved February 16, 2017, from http://content.healthaffairs.org/content/32/11/2013.full

Fry, R. (2016, April 25). Millennials overtake Baby Boomers as America's largest generation. Pew Research Center: Washington D.C. Retrieved February

13, 2017, from http://www.pewresearch.org/fact-tank/2016/04/25/millennials-overtake-baby-boomers/

Gallagher, T. (2016). Chapter 1: Economic analysis. Workforce Planning Report 2016, *Wyoming Labor Force Trends, 53*(4). Retrieved February 28, 2017, from http://doe.state.wy.us/LMI/trends/0416/a1.htm

Glover, T. (2012, March). A decade later: Tracking Wyoming's youth into the labor force. *Wyoming Labor Force Trends 49*(3). Retrieved February 13, 2017, from http://doe.state.wy.us/lmi/trends/0312/a1.htm

Glover, T., Knapp, L., Leonard, D. W., Manning, P., and Moore, M. (2011, Fall). *Occasional Paper No. 6: Health Care Needs in Wyoming: Advancing the Study*. Casper: Wyoming Department of Workforce Services, Research & Planning. Retrieved February 22, 2017, from http://doe.state.wy.us/lmi/Occasional/occ6.pdf

Holmes, M. (2015, March). Fewer youth working in Wyoming. *Wyoming Labor Force Trends, 52*(3). Retrieved February 13, 2017, from http://doe.state.wy.us/lmi/trends/0315/a1.htm

Institute of Medicine. (2009, February). America's uninsured crisis: Consequences for health and health care. Retrieved February 17, 2017, from http://www.nationalacademies.org/hmd/~/media/Files/Report%20Files/2009/Americas-Uninsured-Crisis-Consequences-for-Health-and-Health-Care/Americas%20Uninsured%20Crisis%202009%20Report%20Brief.pdf

Jones, S. D. (2005). Labor retention: Out-migration of youth. *Wyoming Labor Force Trends, 42*(6). Retrieved February 13, 2017, from http://doe.state.wy.us/lmi/0605/a1.htm

Kaiser Family Foundation. (2016, September). Key facts about the uninsured population. Retrieved February 27, 2017, from http://kff.org/uninsured/fact-sheet/key-facts-about-the-uninsured-population/

Meit, M., Knudson, A., Gilbert, T., Yu, A. T., Tanenbaum, E., Ormson, E., Tenbroeck, S., Bayne, A., Popat, S. (2014, October). The 2014 update of the rural-urban chartbook. Rural Health Reform Policy Research Center: Bethesda, MD. Retrieved February 17, 2017, from https://ruralhealth.und.edu/projects/health-reform-policy-research-center/pdf/2014-rural-urban-chartbook-update.pdf

Moore, M. (2017, in press). Employment and wage change for selected industries in Wyoming, 2016Q3. *Wyoming Labor Force Trends, 54*(1)

Murphy, M. (2016, July 1). Health cuts to have statewide effects. *Casper Star-Tribune*. Retrieved February 27, 2017, from http://trib.com/news/state-and-regional/health-cuts-to-have-statewide-effects/article_c6e23af8-10c2-5707-8408-2c778d92af1c.html

National Center for Health Statistics. (2014). Health, United States, 2014 with special feature on adults aged 55-64. Centers for Disease Control and Prevention: Hyattsville, MD. Retrieved February 13, 2017, from https://www.cdc.gov/nchs/data/hus/hus14.pdf

National Conference of State Legislatures. (2011). The Affordable Care Act: A brief summary. Retrieved February 17, 2017,

from http://www.ncsl.org/portals/1/documents/health/hraca.pdf

Pierce, K. (2015). SOI migration data: A new approach. Statistics of Income Bulletin. Internal Revenue Service: Washington D.C. Retrieved February 13, 2017, from https://www.irs.gov/pub/irs-soi/soi-a-inmig-id1509.pdf

Population Reference Bureau. (2010, June). Aging and the health care workforce. Today's Research on Aging, 19. Retrieved February 15, 2017, from http://www.prb.org/pdf10/TodaysResearchAging19.pdf

Richardson, H. (2017, February 4). Experts weigh Wyoming's most difficult challenge: Diversifying the economy. *Casper Star-Tribune*. Retrieved February 27, 2017, from http://trib.com/business/energy/experts-weigh-wyoming-s-most-difficult-challenge-diversifying-the-economy/article_830b89a8-3132-5993-9945-149f6959e83d.html

Scott, S. (2017a). Personal communication, March 1, 2017.

Scott, S. (2017b). Personal communication, January 20, 2017.

U.S. Centers for Medicare and Medicaid Services. (2016). NHE fact sheet. Retrieved February 27, 2017, from https://www.cms.gov/research-statistics-data-and-systems/statistics-trends-and-reports/nationalhealthexpenddata/nhe-fact-sheet.html

U.S. Centers for Medicare and Medicaid Services. (n.d.). Eligibility. In Medicaid.gov. Retrieved March 2, 2017, from https://www.medicaid.gov/medicaid/eligibility/index.html

U.S. Centers for Medicare & Medicaid Services. (n.d.). Getting started with Medicare. In Medicare.gov. Retrieved February 27, 2017, from https://www.medicare.gov/people-like-me/new-to-medicare/getting-started-with-medicare.html

U.S. Department of Health and Human Services. (n.d.). Older Adults. In HealthyPeople.gov. Retrieved February 27, 2017, from https://www.healthypeople.gov/2020/topics-objectives/topic/older-adults

Vincent, G.K. & Velkoff, V.A. (2010, May). The next four decades: The older population in the United States 2010-2050. Current Population Reports P25-1138. U.S. Census Bureau: Washington D.C. Retrieved February 13, 2017, from https://www.census.gov/prod/2010pubs/p25-1138.pdf

Wyoming Department of Health (n.d.). Kid Care CHIP. Retrieved March 2, 2017, from https://health.wyo.gov/healthcarefin/chip/

Chapter 3: The Impact of Wyoming Postsecondary Graduates on Supply and Demand of Wyoming's Health Care Workforce

by: Lynae Mohondro, Senior Economist

This chapter will first compare long-term projections to illustrate the demand for a health care workforce and the impact of Wyoming postsecondary graduates. The article will then discuss University of Wyoming (UW) and community college students who graduated from health professions and related programs (Classification of Instructional Programs [CIP] 51) in fall 2006, spring 2007, and summer 2007 and their effect on the supply and demand of the health care workforce in Wyoming and partner states[1]. For the purposes of this article, the graduates from fall 2006, spring 2007, and summer 2007 semester are identified as the 2006/07 cohort.

The total number of persons working in Wyoming at any time decreased by 1.6% (-5,872 individuals) from 2014 to 2015, while the number of persons age 65 and older working at any time increased 2.9% (443 individuals; Moore, 2016). Previous research from the Research & Planning (R&P) section of the Wyoming Department of Workforce Services indicated a substantial outmigration of young people: based on a cohort analysis, approximately half of all 18-year-olds were found working in Wyoming eight years later (Glover, 2012),

In This Chapter

1 Partner states are those state labor market information (LMI) offices with which Research & Planning has data-sharing agreements: Alaska, Colorado, Idaho, Montana, Nebraska, New Mexico, Ohio, Oklahoma, South Dakota, Texas, and Utah.

and only 40% remained working 10 years later. Other studies have found that males who attended high school in Wyoming tend to move out of state whether they have a bachelor's degree or not, whereas females who attended high school in Wyoming and obtained a bachelor's degree go to work in other states more so than those who do not have a bachelor's degree (Mohondro, 2016). As working-aged individuals leave Wyoming, thus reducing the workforce supply, the need for replacement workers under certain circumstances increases.

Wyoming's health care industry (NAICS[2] 62) is one of several industries with an older workforce. This is identified in Wyoming's Workforce Innovation and Opportunity Act (WIOA) Unified Plan at http://wyowdc.wyo.gov/unified-state-plan-1. With aging health care workers retiring and possibly needing additional health care themselves, the need for more health care workers in Wyoming becomes even greater. The University of Wyoming (UW) and the state's community colleges all offer degrees in health care. With access to Unemployment Insurance wage records and UW and community college student records, R&P has the ability to determine how many students who graduate with a degree in health care continue working in Wyoming or go to work in another state.

Supply and demand reports provide readers with an idea of how many trained workers it will take to meet employer demand (National Skills Coalition, 2014). As an example of the influence graduates can have on the workforce, Table 3.1 uses the long-term statewide employment projections from 2006-2016 to compare the number of projected vacancies in the health care industry and the influence the 2006/07 graduates have on the health care workforce. R&P updates projections every two years, thus the long-term projections with the base year of 2006 and a projected year of 2016 illustrate the demand for the employment of the 2006/07 cohort. Industry projections do not provide exact employment, but, as noted by Saulcy and Jones (2009), "use historical

2 North American Industry Classification System.

Table 3.1: **Projected Vacancies in Wyoming Health Care and Impact of 2006/07 Health Care and Related Professions (CIP[a] 51) Graduates, 2007-2016**

Year	A Projected Yearly Vacancies[b]	B Projected Cumulative Vacancies (A[Year 1] + A[Year 2])[b]	C N Employed 2006/07 Graduates	D N Not Employed From Previous Year (C[Year1] - C[Year2])	E Yearly Vacancies (A+D)	F Cumulative Vacancies (F[Year-1] + E)
2007	585	585	592		585	585
2008	585	1,170	546	46	631	1,216
2009	585	1,755	531	15	600	1,816
2010	585	2,340	496	35	620	2,436
2011	585	2,925	469	27	612	3,048
2012	585	3,510	460	9	594	3,642
2013	585	4,095	429	31	616	4,258
2014	585	4,680	418	11	596	4,854
2015	585	5,265	402	16	601	5,455
2016	585	5,850	372	30	615	6,070

[a]Classification of Instructional Programs.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
[b]Source: 2006-2016 Statewide Employment Projections.
Prepared by L. Mohondro, Research & Planning, WY DWS, 3/9/2017.

trends in employment within an industry to predict whether the industry is expected to expand or contract over the next decade."

This analysis uses the 2006/07 cohort, the earliest available to R&P, which provides the longest period to observe student outcomes and the corresponding 2006-2016 projections. This analysis is an initial attempt at assembling the data and will be refined as R&P continues to explore new ideas. The projections predicted that about 585 jobs would become available in the health care industry each year from 2006 to 2016. Table 3.1 (see page 36) shows that in 2007, 592 graduates from the 2006/07 cohort with a degree in CIP 51 worked in Wyoming and declined every year through 2016. As the number of graduates working in Wyoming declined, the projected demand for workers from future graduating classes increased. For example, the 2007/08 cohort would need to fill an additional 46 jobs combined with the 585 available jobs as shown by projections, for a total of 631 jobs in 2008. Table 3.1 only represents the demand from the 2006/07 cohort. Realistically, many factors will influence demand on the workforce, such as oil and gas prices. The demand could continue to increase for several other reasons as future graduates leave Wyoming's workforce. Additionally, in 2007, about 8.0% of individuals over the age of 16 worked more than

Table 3.2: 2006/07 Health Care and Related Professions (CIP[a] 51) Graduates from Wyoming Postsecondary Institution Working in WY and Partner States[b] (N=879)

		Working in WY		Working in Partner State		Total Found	
Year After Grad.	Quarter After Grad.	N	%	N	%	N	%
0	0	535	60.9	76	8.6	611	69.5
1	1	541	61.5	128	14.6	669	76.1
	2	524	59.6	140	15.9	664	75.5
	3	528	60.1	145	16.5	673	76.6
	4	520	59.2	147	16.7	667	75.9
2	5	508	57.8	156	17.7	664	75.5
	6	499	56.8	155	17.6	654	74.4
	7	491	55.9	158	18.0	649	73.8
	8	491	55.9	156	17.7	647	73.6
3	9	487	55.4	156	17.7	643	73.2
	10	494	56.2	149	17.0	643	73.2
	11	489	55.6	149	17.0	638	72.6
	12	478	54.4	155	17.6	633	72.0
4	13	463	52.7	169	19.2	632	71.9
	14	465	52.9	171	19.5	636	72.4
	15	459	52.2	171	19.5	630	71.7
	16	449	51.1	175	19.9	624	71.0
5	17	438	49.8	180	20.5	618	70.3
	18	432	49.1	175	19.9	607	69.1
	19	439	49.9	169	19.2	608	69.2
	20	441	50.2	173	19.7	614	69.9
6	21	431	49.0	178	20.3	609	69.3
	22	421	47.9	181	20.6	602	68.5
	23	416	47.3	180	20.5	596	67.8
	24	410	46.6	186	21.2	596	67.8
7	25	405	46.1	194	22.1	599	68.1
	26	395	44.9	192	21.8	587	66.8
	27	393	44.7	198	22.5	591	67.2
	28	393	44.7	200	22.8	593	67.5
8	29	398	45.3	199	22.6	597	67.9
	30	400	45.5	200	22.8	600	68.3
	31	396	45.1	200	22.8	596	67.8
	32	383	43.6	210	23.9	593	67.5

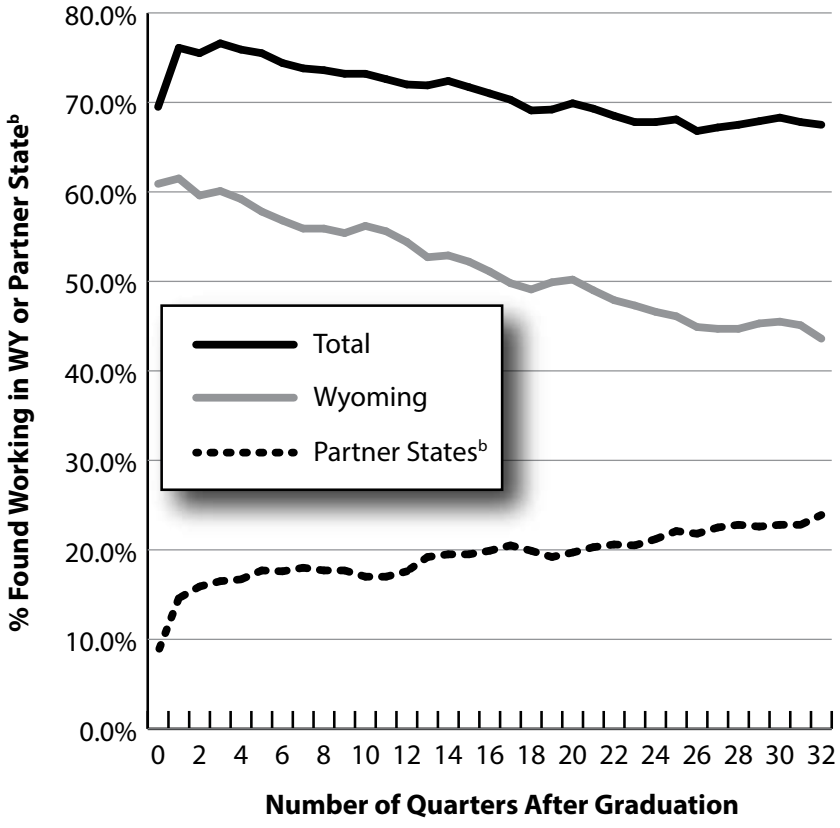
[a]Classification of Instructional Programs.
[b]Partner states are those state labor market information (LMI) offices with which Research & Planning has data-sharing agreements: Alaska, Colorado, Idaho, Montana, Nebraska, New Mexico, Ohio, Oklahoma, South Dakota, Texas, and Utah.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
Prepared by L. Mohondro, Research & Planning, WY DWS, 3/9/2017.

one job[3]. Because projections measure jobs rather than individuals, the supply and demand may be affected more if graduates hold more than one job.

While it may appear that the supply of workers from the 2006/07 cohort should exceed the demand from R&P's employment projections, the supply of workers gradually disappears after graduation as people go to work in other states, choose to remain out of the workforce, or are unable to participate. As the 2006/07 graduates leave the Wyoming workforce, the replacement of supply will be left up to future graduating classes.

R&P's long-term employment projections show an expected growth of 5,856 jobs in Wyoming's health care industry (NAICS 621, 622, 623) between 2006 and 2016 (25.0% over 10 years; 585 jobs of all types per year; Leonard, 2008). At the beginning of that period, 879 students graduated from a Wyoming postsecondary education institution with a certificate, associate's, bachelor's, master's, or professional degree in a health care program (CIP 51) as part of the 2006/07 cohort. Three quarters after graduation, the percentage of students found working in Wyoming or a partner state reached 76.6% (see Table 3.2, page 37). Eight years after graduation, the percentage of graduates found working in Wyoming dropped to 43.6% and the percentage working in partner states increased to 23.9%. This indicates that while the majority of graduates work in Wyoming or a partner state, a gradual shift occurs towards more graduates working in other states.

Figure 3.1 shows that in eight years after graduation, the percentage of graduates from a health care program at a Wyoming postsecondary education institution from the 2006/07 cohort found



[a]Classification of Instructional Programs.
[b]Partner states are those state labor market information (LMI) offices with which Research & Planning has data-sharing agreements: Alaska, Colorado, Idaho, Montana, Nebraska, New Mexico, Ohio, Oklahoma, South Dakota, Texas, and Utah.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
Prepared by L. Mohondro, Research & Planning, WY DWS, 3/9/2017.

Figure 3.1: 2006/07 Health Care and Related Professions (CIP[a] 51) Graduates from Wyoming Postsecondary Institution Working in Wyoming and Partner States (N=879)

3 Bureau of Labor Statistics, Labor Force Statistics from the Current Population Survey. Multiple Jobholders as a Percent of Employed. Retrieved March 9, 2017, from https://data.bls.gov/pdq/SurveyOutputServlet.

working in Wyoming or a partner state increased by 9.3 percentage points, while the percentage of graduates working in Wyoming decreased by almost 18 percentage points. The increase in the percentage of graduates working in partner states shows that some students are leaving Wyoming to work in states with growing economies such as Colorado and Utah.

(Text continued on page 41)

Table 3.3: 2006/07 Health Care and Related Professions (CIP[a] 51) Graduates from Wyoming Postsecondary Education Institution Working in WY and Partner States[b] by Gender

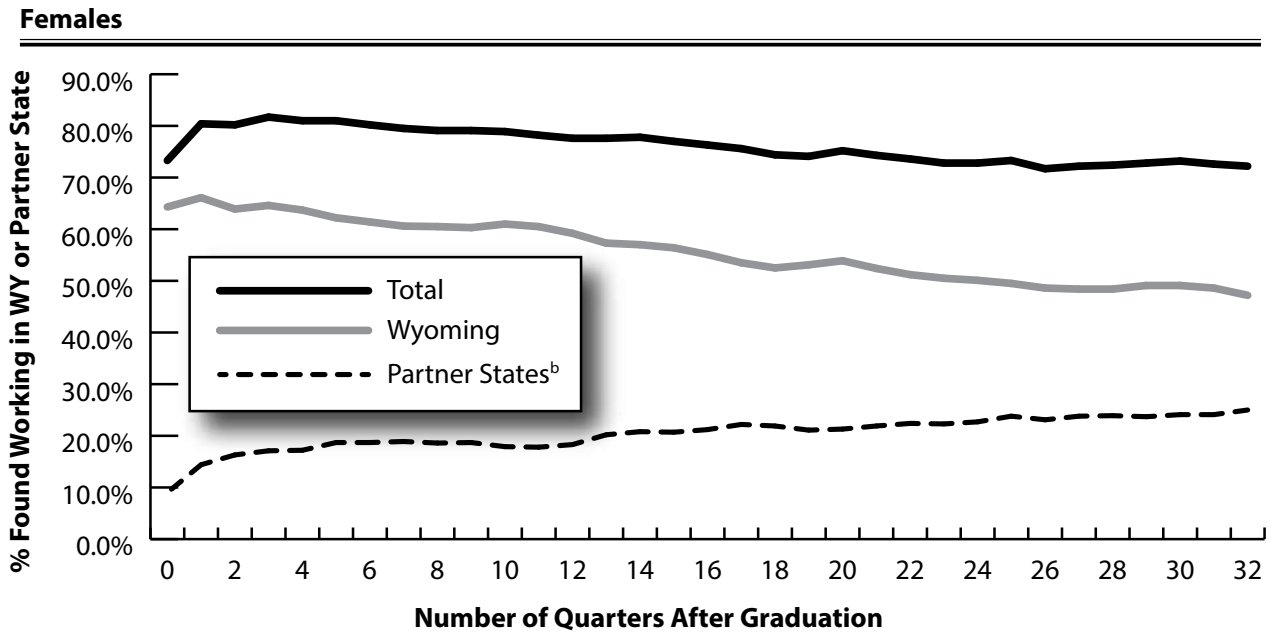
		Female (N=731)						Male (N=125)					
		Wyoming		Partner States		Total		Wyoming		Partner States		Total	
Year After Grad.	Quarter After Grad.	N	%	N	%	N	%	N	%	N	%	N	%
0	0	470	64.3	66	9.0	536	73.3	64	51.2	10	8.0	74	59.2
1	1	483	66.1	105	14.4	588	80.4	58	46.4	22	17.6	80	64.0
	2	467	63.9	119	16.3	586	80.2	57	45.6	21	16.8	78	62.4
	3	472	64.6	125	17.1	597	81.7	56	44.8	20	16.0	76	60.8
	4	466	63.7	126	17.2	592	81.0	54	43.2	21	16.8	75	60.0
2	5	455	62.2	137	18.7	592	81.0	53	42.4	19	15.2	72	57.6
	6	449	61.4	137	18.7	586	80.2	50	40.0	18	14.4	68	54.4
	7	443	60.6	138	18.9	581	79.5	48	38.4	20	16.0	68	54.4
	8	442	60.5	136	18.6	578	79.1	49	39.2	20	16.0	69	55.2
3	9	441	60.3	137	18.7	578	79.1	46	36.8	19	15.2	65	52.0
	10	446	61.0	131	17.9	577	78.9	48	38.4	18	14.4	66	52.8
	11	442	60.5	130	17.8	572	78.2	47	37.6	19	15.2	66	52.8
	12	433	59.2	134	18.3	567	77.6	45	36.0	21	16.8	66	52.8
4	13	419	57.3	148	20.2	567	77.6	44	35.2	21	16.8	65	52.0
	14	417	57.0	152	20.8	569	77.8	48	38.4	19	15.2	67	53.6
	15	412	56.4	151	20.7	563	77.0	47	37.6	20	16.0	67	53.6
	16	403	55.1	155	21.2	558	76.3	46	36.8	20	16.0	66	52.8
5	17	391	53.5	162	22.2	553	75.6	47	37.6	18	14.4	65	52.0
	18	384	52.5	160	21.9	544	74.4	48	38.4	15	12.0	63	50.4
	19	388	53.1	154	21.1	542	74.1	51	40.8	15	12.0	66	52.8
	20	394	53.9	156	21.3	550	75.2	47	37.6	17	13.6	64	51.2
6	21	383	52.4	160	21.9	543	74.3	48	38.4	18	14.4	66	52.8
	22	374	51.2	164	22.4	538	73.6	47	37.6	17	13.6	64	51.2
	23	369	50.5	163	22.3	532	72.8	47	37.6	17	13.6	64	51.2
	24	366	50.1	166	22.7	532	72.8	44	35.2	20	16.0	64	51.2
7	25	362	49.5	174	23.8	536	73.3	43	34.4	20	16.0	63	50.4
	26	355	48.6	169	23.1	524	71.7	40	32.0	23	18.4	63	50.4
	27	354	48.4	174	23.8	528	72.2	39	31.2	24	19.2	63	50.4
	28	354	48.4	175	23.9	529	72.4	39	31.2	25	20.0	64	51.2
8	29	359	49.1	173	23.7	532	72.8	39	31.2	26	20.8	65	52.0
	30	359	49.1	176	24.1	535	73.2	40	32.0	24	19.2	64	51.2
	31	355	48.6	176	24.1	531	72.6	40	32.0	24	19.2	64	51.2
	32	345	47.2	183	25.0	528	72.2	37	29.6	27	21.6	64	51.2

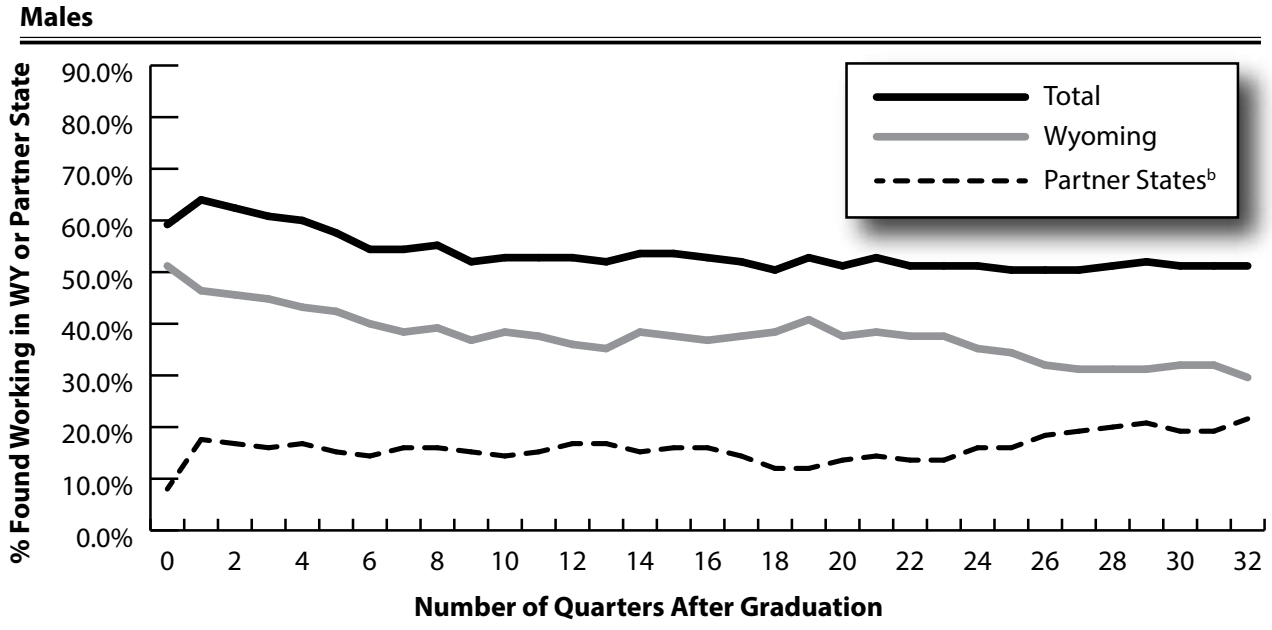
[a]Classification of Instructional Programs.

[b]Partner states are those state labor market information (LMI) offices with which Research & Planning has data-sharing agreements: Alaska, Colorado, Idaho, Montana, Nebraska, New Mexico, Ohio, Oklahoma, South Dakota, Texas, and Utah.

Source: Workforce Data Quality Initiative (WDQI) custom extract.

Prepared by L. Mohondro, Research & Planning, WY DWS, 3/9/2017.





[a]Classification of Instructional Programs.
[b]Partner states are those state labor market information (LMI) offices with which Research & Planning has data-sharing agreements: Alaska, Colorado, Idaho, Montana, Nebraska, New Mexico, Ohio, Oklahoma, South Dakota, Texas, and Utah.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
Prepared by L. Mohondro, Research & Planning, WY DWS, 3/9/2017.

Figure 3.2: **2006/07 Health Care and Related Professions (CIP[a] 51) Graduates from Wyoming Postsecondary Education Institution Working in Wyoming and Partner States by Gender**

(Text continued from page 39)

The health care programs offered by UW and the community colleges tend to be female dominated. Of the 2006/07 cohort, 731 females (83.2%) and 125 males (14.2%) graduated from a health care program (demographics were not available for 47 graduates, or 5.3%). Table 3.3 shows that one quarter after graduation, 80.4% of female graduates worked in Wyoming or a partner state, compared to 64.0% of male graduates. Eight years after graduation, the percentage of female graduates found working decreased to 72.2%: 47.2% in Wyoming and 25.0% in partner states. In that same time, the percentage of males found working decreased to 51.2%: 29.6% in Wyoming and 21.6% in a partner state (see Table 3.3, page 39). Fewer males who graduated with a degree in health care worked in Wyoming or a partner state than females, and during the eight years following graduation, and both males and females left Wyoming to work in partner states and states with which R&P does not have a data-sharing agreement.

Following graduation, the percentage of males working in Wyoming decreased more rapidly than the percentage of females. Almost two years after graduation, the percentage of males working in Wyoming dropped 12.8 percentage points, while the percentage of females working in Wyoming decreased more gradually over the eight years following graduation (see Figure 3.2, page 40). This shows that males with a degree in health care were more likely to leave Wyoming's workforce sooner after graduation than females, possibly to work in another state.

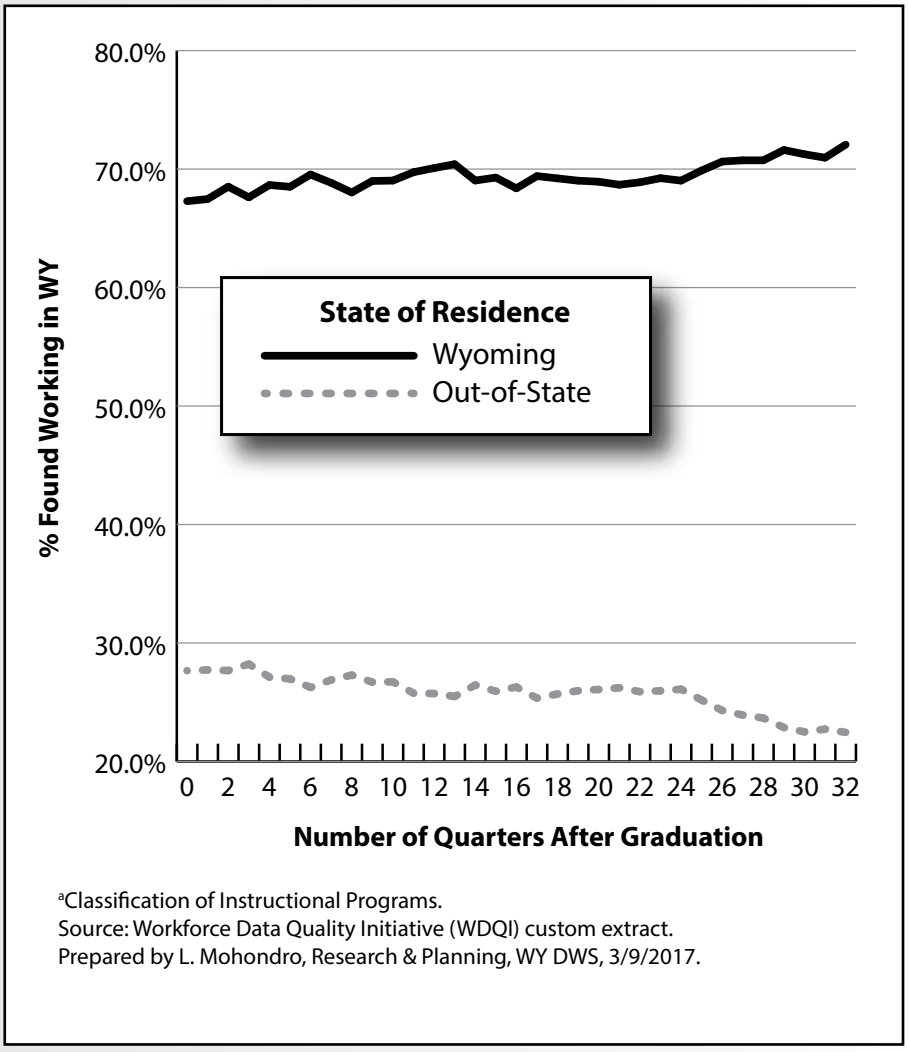
The majority of graduates from the 2006/07 cohort graduated with an associate's degree or certificate. Graduates with these degrees are more likely to be found working in Wyoming and partner states during the eight years after graduating. As shown in Table 3.4 (see pages 44-45), between 70.8% and 85.6% of graduates with an associate's degree worked in Wyoming or a partner state during the eight years following graduation. Graduates who earned bachelor's degrees were the least likely to be found working in Wyoming or a partner state eight years after graduation (56.1%). Students who earned a graduate degree (master's, PhD, etc.) made up the highest percentage of graduates who were found working in one of the 11 partner states during the eighth year after graduation (30.1%; see Table 3.4). Overall, more graduates with lower level degrees in health care worked in Wyoming during the eight years following graduation than graduates with a bachelor's or master's degree in health care.

As noted earlier, many of the health care programs offered at Wyoming postsecondary education institutions tend to be female dominated. The most students graduated with a degree in registered nursing (RNs; four-digit CIP 5138; n = 339) and practical nursing, vocational nursing, & nursing assistants (LPNs, CNAs, and vocational nurses; four-digit CIP 5139; n = 179). As seen in Table 3.5 (see pages 46-49), graduates from these two nursing programs (CIP 5138 and 5139) were more likely to be found working in Wyoming than graduates from another health care program. Between 64.3% and 66.4% of RNs and 70.4% to 74.9% of LPNs, CNAs, and vocational nurses worked in Wyoming during the first year after graduating. Eight years after graduating, 44.8% of RNs and 50.8% of LPNs, CNAs, and vocational nurses remained working in Wyoming. During this time, the supply of RNs working in a partner state increased

to 19.8% while 23.5% of LPNs, CNAs, and vocational nurses worked in a partner state. The decrease of RNs, LPNs, CNAs, and vocational nurses in Wyoming with the increase in partner states suggests that these graduates are gradually leaving Wyoming for work in other states.

Graduates from most health care CIP codes were more likely to work in Wyoming than a partner state; however, individuals who graduated with a degree in pharmacy, pharmaceutical sciences, & administration (four-digit CIP 5120) were more likely to be found working in a partner state than in Wyoming in every quarter during the eight years following graduation. Eight years after graduation, 65.2% of CIP 5120 graduates were found working: 21.7% in Wyoming and 43.5% in a partner state. By the eighth year after graduation, at least one-fourth of graduates from all other CIP codes worked in partner states, suggesting that graduates with degrees in most health care programs eventually leave to work in partner states.

Students who reside in other states but enroll in a Wyoming college make up another source of workforce supply for Wyoming. While some of these students may stay in Wyoming to work, others may return to their resident state to find work. As seen in Figure 3.3, about 70% of 2006/07 CIP 51 graduates with Wyoming residency remained working in Wyoming through the eighth year after graduation, while more than one-fourth of students with out-of-state residency worked in Wyoming until the seventh year after graduation before dropping slightly. The percentage of graduates working in other states fluctuated more; between 54% and 60% of out-of-state students worked in other states, while about one-third of in-state students worked in other states during the eight years following graduation (see Figure 3.4, page 43). It should be noted that

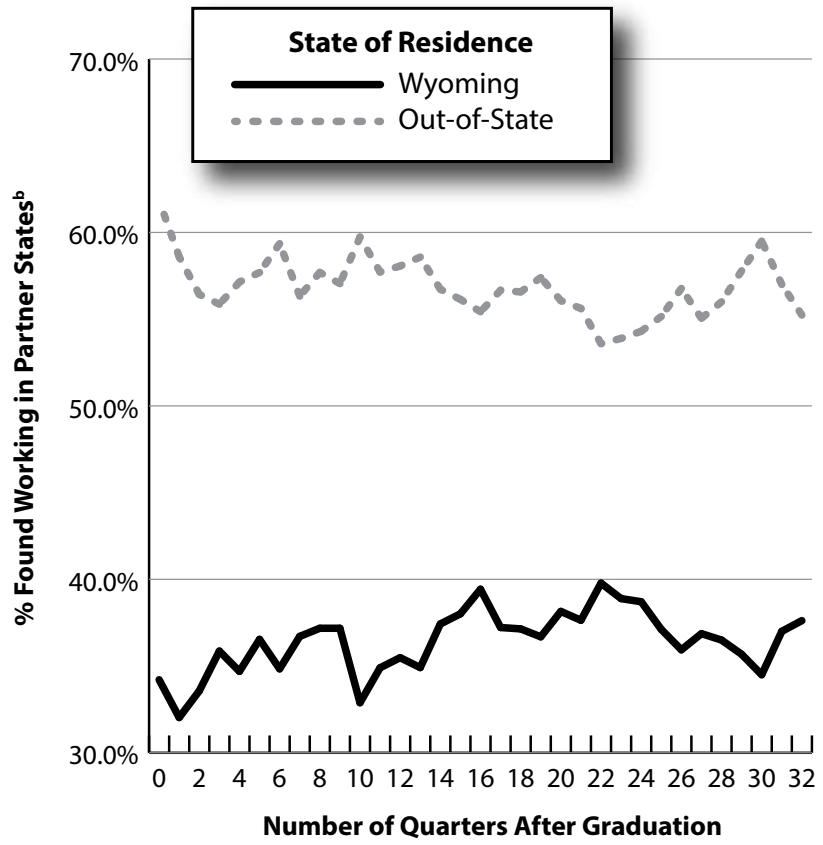


[a]Classification of Instructional Programs.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
Prepared by L. Mohondro, Research & Planning, WY DWS, 3/9/2017.

Figure 3.3: **2006/07 Health Care and Related Professions (CIP[a] 51) Graduates Working in Wyoming by State of Residency**

graduates with residency in other states are over counted in this article. Data provided to R&P labeled students attending community colleges as a Wyoming high school graduate or a high school graduate from another state. Without any additional data to better determine student residency, any Wyoming resident graduate of a community college who attended high school in another state is considered an out-of-state resident for the purposes of this chapter.

Previous studies from R&P have shown that young workers from Wyoming tend to leave to work in other states, creating less supply and greater replacement need for workers in the state. Less than half of Wyoming's postsecondary education students who graduated in 2006/07 cohort with a degree in health care remained working in Wyoming. The migration of postsecondary education graduates creates an even greater replacement need for future graduates going into the health care workforce. It is possible that some of these students attended Wyoming postsecondary schools from out-of-state and returned home for work after graduation. Graduates may leave Wyoming due to more employment opportunities in the growing economies of other states or due to relocation of employment of a spouse. Future research will include studies on the work experience of the graduates from 2006/07 cohort beyond eight years after graduation and the work experience of graduates from later semesters as data becomes available. In addition, R&P is working to create a dataset in which the household is the unit of measurement. As these data become available, studies on the relocation of individuals for reasons related to families will also



[a]Classification of Instructional Programs.
[a]Partner states are those state labor market information (LMI) offices with which Research & Planning has data-sharing agreements: Alaska, Colorado, Idaho, Montana, Nebraska, New Mexico, Ohio, Oklahoma, South Dakota, Texas, and Utah.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
Prepared by L. Mohondro, Research & Planning, WY DWS, 3/9/2017.

Figure 3.4: 2006/07 Health Care and Related Professions (CIP[a] 51) Graduates Working in Partner States[b] by State of Residency

(Text continued on page 49)

Table 3.4: 2006/07 Health Care and Related Professions (CIP[a] 51) Graduates from Wyoming Postsecondary Education Institution Working in WY and Partner States[b] by Degree Level

		Certificate (N=246)						Associate's (N=411)					
		Wyoming		Partner States		Total		Wyoming		Partner States		Total	
Year After Grad.	Quarter After Grad.	N	%	N	%	N	%	N	%	N	%	N	%
0	0	148	60.2	13	5.3	161	65.4	287	69.8	33	8.0	320	77.9
1	1	158	64.2	20	8.1	178	72.4	287	69.8	65	15.8	352	85.6
	2	161	65.4	18	7.3	179	72.8	272	66.2	77	18.7	349	84.9
	3	164	66.7	20	8.1	184	74.8	274	66.7	76	18.5	350	85.2
	4	160	65.0	25	10.2	185	75.2	271	65.9	74	18.0	345	83.9
2	5	157	63.8	31	12.6	188	76.4	266	64.7	77	18.7	343	83.5
	6	156	63.4	33	13.4	189	76.8	260	63.3	78	19.0	338	82.2
	7	152	61.8	33	13.4	185	75.2	256	62.3	80	19.5	336	81.8
	8	151	61.4	33	13.4	184	74.8	256	62.3	77	18.7	333	81.0
3	9	148	60.2	33	13.4	181	73.6	256	62.3	79	19.2	335	81.5
	10	151	61.4	33	13.4	184	74.8	255	62.0	78	19.0	333	81.0
	11	149	60.6	33	13.4	182	74.0	253	61.6	77	18.7	330	80.3
	12	147	59.8	30	12.2	177	72.0	244	59.4	84	20.4	328	79.8
4	13	141	57.3	34	13.8	175	71.1	239	58.2	87	21.2	326	79.3
	14	140	56.9	36	14.6	176	71.5	240	58.4	88	21.4	328	79.8
	15	141	57.3	36	14.6	177	72.0	232	56.4	88	21.4	320	77.9
	16	135	54.9	38	15.4	173	70.3	230	56.0	94	22.9	324	78.8
5	17	135	54.9	38	15.4	173	70.3	222	54.0	95	23.1	317	77.1
	18	130	52.8	36	14.6	166	67.5	219	53.3	94	22.9	313	76.2
	19	133	54.1	36	14.6	169	68.7	223	54.3	88	21.4	311	75.7
	20	132	53.7	39	15.9	171	69.5	226	55.0	87	21.2	313	76.2
6	21	126	51.2	44	17.9	170	69.1	222	54.0	86	20.9	308	74.9
	22	126	51.2	39	15.9	165	67.1	213	51.8	94	22.9	307	74.7
	23	118	48.0	39	15.9	157	63.8	218	53.0	93	22.6	311	75.7
	24	116	47.2	41	16.7	157	63.8	214	52.1	100	24.3	314	76.4
7	25	115	46.7	44	17.9	159	64.6	208	50.6	101	24.6	309	75.2
	26	113	45.9	48	19.5	161	65.4	205	49.9	95	23.1	300	73.0
	27	116	47.2	50	20.3	166	67.5	200	48.7	101	24.6	301	73.2
	28	114	46.3	53	21.5	167	67.9	201	48.9	100	24.3	301	73.2
8	29	118	48.0	53	21.5	171	69.5	201	48.9	99	24.1	300	73.0
	30	119	48.4	51	20.7	170	69.1	200	48.7	97	23.6	297	72.3
	31	121	49.2	54	22.0	175	71.1	199	48.4	92	22.4	291	70.8
	32	116	47.2	56	22.8	172	69.9	192	46.7	99	24.1	291	70.8

[a]Classification of Instructional Programs

[b]Partner states are those state labor market information (LMI) offices with which Research & Planning has data-sharing agreements: Alaska, Colorado, Idaho, Montana, Nebraska, New Mexico, Ohio, Oklahoma, South Dakota, Texas, and Utah.

Source: Workforce Data Quality Initiative (WDQI) custom extract.

Prepared by L. Mohondro, Research & Planning, WY DWS, 3/9/2017.

(Table continued on page 45)

(Table continued from page 44)

Table 3.4: 2006/07 Health Care and Related Professions (CIP[a] 51) Graduates from Wyoming Postsecondary Education Institution Working in WY and Partner States[b] by Degree Level

		Bachelor's (N=139)						Graduate (N=83)					
		Wyoming		Partner States		Total		Wyoming		Partner States		Total	
Year After Grad.	Quarter After Grad.	N	%	N	%	N	%	N	%	N	%	N	%
0	0	67	48.2	13	9.4	80	57.6	33	39.8	17	20.5	50	60.2
1	1	68	48.9	21	15.1	89	64.0	28	33.7	22	26.5	50	60.2
	2	61	43.9	24	17.3	85	61.2	30	36.1	21	25.3	51	61.4
	3	60	43.2	28	20.1	88	63.3	30	36.1	21	25.3	51	61.4
	4	57	41.0	28	20.1	85	61.2	32	38.6	20	24.1	52	62.7
2	5	53	38.1	28	20.1	81	58.3	32	38.6	20	24.1	52	62.7
	6	52	37.4	26	18.7	78	56.1	31	37.3	18	21.7	49	59.0
	7	52	37.4	27	19.4	79	56.8	31	37.3	18	21.7	49	59.0
	8	54	38.8	29	20.9	83	59.7	30	36.1	17	20.5	47	56.6
3	9	54	38.8	27	19.4	81	58.3	29	34.9	17	20.5	46	55.4
	10	58	41.7	22	15.8	80	57.6	30	36.1	16	19.3	46	55.4
	11	58	41.7	22	15.8	80	57.6	29	34.9	17	20.5	46	55.4
	12	57	41.0	26	18.7	83	59.7	30	36.1	15	18.1	45	54.2
4	13	54	38.8	30	21.6	84	60.4	29	34.9	18	21.7	47	56.6
	14	55	39.6	28	20.1	83	59.7	30	36.1	19	22.9	49	59.0
	15	56	40.3	29	20.9	85	61.2	30	36.1	18	21.7	48	57.8
	16	54	38.8	26	18.7	80	57.6	30	36.1	17	20.5	47	56.6
5	17	52	37.4	28	20.1	80	57.6	29	34.9	19	22.9	48	57.8
	18	53	38.1	27	19.4	80	57.6	30	36.1	18	21.7	48	57.8
	19	52	37.4	25	18.0	77	55.4	31	37.3	20	24.1	51	61.4
	20	52	37.4	27	19.4	79	56.8	31	37.3	20	24.1	51	61.4
6	21	51	36.7	29	20.9	80	57.6	32	38.6	19	22.9	51	61.4
	22	50	36.0	29	20.9	79	56.8	32	38.6	19	22.9	51	61.4
	23	49	35.3	28	20.1	77	55.4	31	37.3	20	24.1	51	61.4
	24	52	37.4	26	18.7	78	56.1	28	33.7	19	22.9	47	56.6
7	25	52	37.4	29	20.9	81	58.3	30	36.1	20	24.1	50	60.2
	26	50	36.0	29	20.9	79	56.8	27	32.5	20	24.1	47	56.6
	27	49	35.3	27	19.4	76	54.7	28	33.7	20	24.1	48	57.8
	28	49	35.3	28	20.1	77	55.4	29	34.9	19	22.9	48	57.8
8	29	51	36.7	26	18.7	77	55.4	28	33.7	21	25.3	49	59.0
	30	52	37.4	29	20.9	81	58.3	29	34.9	23	27.7	52	62.7
	31	50	36.0	30	21.6	80	57.6	26	31.3	24	28.9	50	60.2
	32	48	34.5	30	21.6	78	56.1	27	32.5	25	30.1	52	62.7

[a]Classification of Instructional Programs

[b]Partner states are those state labor market information (LMI) offices with which Research & Planning has data-sharing agreements: Alaska, Colorado, Idaho, Montana, Nebraska, New Mexico, Ohio, Oklahoma, South Dakota, Texas, and Utah.

Source: Workforce Data Quality Initiative (WDQI) custom extract.

Prepared by L. Mohondro, Research & Planning, WY DWS, 3/9/2017.

Table 3.5: **2006/07 Graduates from Selected Health Care & Related Professions (CIP[a] 51) Graduates from Wyoming Postsecondary Education Institution Working in WY and Partner States[b] by Program of Study**

		Dental Support Services & Allied Professions (CIP 5106; N=75)						Allied Health and Medical Assisting Services (CIP 5108; N=31)					
		Wyoming		Partner States		Total		Wyoming		Partner States		Total	
Year After Grad.	Quarter After Grad.	N	%	N	%	N	%	N	%	N	%	N	%
0	0	36	48.0	9	12.0	45	60.0	15	48.4	10	32.3	25	80.6
1	1	39	52.0	26	34.7	65	86.7	14	45.2	11	35.5	25	80.6
	2	32	42.7	31	41.3	63	84.0	16	51.6	10	32.3	26	83.9
	3	31	41.3	31	41.3	62	82.7	16	51.6	11	35.5	27	87.1
	4	35	46.7	30	40.0	65	86.7	15	48.4	10	32.3	25	80.6
2	5	37	49.3	27	36.0	64	85.3	15	48.4	11	35.5	26	83.9
	6	35	46.7	27	36.0	62	82.7	15	48.4	11	35.5	26	83.9
	7	33	44.0	29	38.7	62	82.7	18	58.1	10	32.3	28	90.3
	8	30	40.0	27	36.0	57	76.0	18	58.1	8	25.8	26	83.9
3	9	31	41.3	27	36.0	58	77.3	18	58.1	9	29.0	27	87.1
	10	32	42.7	28	37.3	60	80.0	18	58.1	9	29.0	27	87.1
	11	31	41.3	28	37.3	59	78.7	18	58.1	9	29.0	27	87.1
	12	30	40.0	27	36.0	57	76.0	17	54.8	9	29.0	26	83.9
4	13	31	41.3	28	37.3	59	78.7	16	51.6	10	32.3	26	83.9
	14	32	42.7	27	36.0	59	78.7	16	51.6	10	32.3	26	83.9
	15	32	42.7	28	37.3	60	80.0	16	51.6	10	32.3	26	83.9
	16	31	41.3	27	36.0	58	77.3	15	48.4	8	25.8	23	74.2
5	17	32	42.7	27	36.0	59	78.7	16	51.6	8	25.8	24	77.4
	18	30	40.0	28	37.3	58	77.3	16	51.6	8	25.8	24	77.4
	19	31	41.3	26	34.7	57	76.0	16	51.6	8	25.8	24	77.4
	20	31	41.3	25	33.3	56	74.7	16	51.6	8	25.8	24	77.4
6	21	31	41.3	25	33.3	56	74.7	16	51.6	8	25.8	24	77.4
	22	31	41.3	27	36.0	58	77.3	16	51.6	8	25.8	24	77.4
	23	30	40.0	27	36.0	57	76.0	15	48.4	8	25.8	23	74.2
	24	30	40.0	27	36.0	57	76.0	14	45.2	9	29.0	23	74.2
7	25	30	40.0	27	36.0	57	76.0	14	45.2	8	25.8	22	71.0
	26	31	41.3	27	36.0	58	77.3	14	45.2	8	25.8	22	71.0
	27	32	42.7	28	37.3	60	80.0	12	38.7	9	29.0	21	67.7
	28	32	42.7	27	36.0	59	78.7	12	38.7	10	32.3	22	71.0
8	29	34	45.3	26	34.7	60	80.0	11	35.5	8	25.8	19	61.3
	30	34	45.3	25	33.3	59	78.7	11	35.5	8	25.8	19	61.3
	31	34	45.3	26	34.7	60	80.0	10	32.3	7	22.6	17	54.8
	32	32	42.7	28	37.3	60	80.0	11	35.5	9	29.0	20	64.5

[a]Classification of Instructional Programs

[b]Partner states are those state labor market information (LMI) offices with which Research & Planning has data-sharing agreements: Alaska, Colorado, Idaho, Montana, Nebraska, New Mexico, Ohio, Oklahoma, South Dakota, Texas, and Utah.

Source: Workforce Data Quality Initiative (WDQI) custom extract.

Prepared by L. Mohondro, Research & Planning, WY DWS, 3/9/2017.

(Table continued on page 47)

(Table continued from page 46)

Table 3.5: 2006/07 Graduates from Selected Health Care & Related Professions (CIP[a] 51) Graduates from Wyoming Postsecondary Education Institution Working in WY and Partner States[b] by Program of Study

		Allied Health Diagnostic, Intervention, & Treatment Professions (CIP 5109; N=90)						Pharmacy, Pharmaceutical Sciences, & Administration (CIP 5120; N=46)					
		Wyoming		Partner States		Total		Wyoming		Partner States		Total	
Year After Grad.	Quarter After Grad.	N	%	N	%	N	%	N	%	N	%	N	%
0	0	48	53.3	9	10.0	57	63.3	14	30.4	14	30.4	28	60.9
1	1	46	51.1	15	16.7	61	67.8	11	23.9	19	41.3	30	65.2
	2	45	50.0	17	18.9	62	68.9	11	23.9	19	41.3	30	65.2
	3	44	48.9	15	16.7	59	65.6	11	23.9	19	41.3	30	65.2
	4	44	48.9	15	16.7	59	65.6	12	26.1	18	39.1	30	65.2
2	5	45	50.0	15	16.7	60	66.7	12	26.1	19	41.3	31	67.4
	6	42	46.7	15	16.7	57	63.3	12	26.1	17	37.0	29	63.0
	7	40	44.4	15	16.7	55	61.1	12	26.1	17	37.0	29	63.0
	8	37	41.1	17	18.9	54	60.0	12	26.1	16	34.8	28	60.9
3	9	36	40.0	17	18.9	53	58.9	12	26.1	16	34.8	28	60.9
	10	37	41.1	18	20.0	55	61.1	12	26.1	15	32.6	27	58.7
	11	41	45.6	17	18.9	58	64.4	12	26.1	16	34.8	28	60.9
	12	39	43.3	16	17.8	55	61.1	13	28.3	14	30.4	27	58.7
4	13	38	42.2	17	18.9	55	61.1	13	28.3	16	34.8	29	63.0
	14	39	43.3	19	21.1	58	64.4	13	28.3	17	37.0	30	65.2
	15	38	42.2	19	21.1	57	63.3	13	28.3	16	34.8	29	63.0
	16	38	42.2	20	22.2	58	64.4	13	28.3	16	34.8	29	63.0
5	17	37	41.1	18	20.0	55	61.1	13	28.3	18	39.1	31	67.4
	18	37	41.1	17	18.9	54	60.0	13	28.3	17	37.0	30	65.2
	19	40	44.4	18	20.0	58	64.4	14	30.4	18	39.1	32	69.6
	20	36	40.0	19	21.1	55	61.1	14	30.4	18	39.1	32	69.6
6	21	36	40.0	22	24.4	58	64.4	14	30.4	18	39.1	32	69.6
	22	34	37.8	22	24.4	56	62.2	14	30.4	18	39.1	32	69.6
	23	35	38.9	22	24.4	57	63.3	15	32.6	18	39.1	33	71.7
	24	34	37.8	23	25.6	57	63.3	14	30.4	17	37.0	31	67.4
7	25	33	36.7	25	27.8	58	64.4	14	30.4	18	39.1	32	69.6
	26	32	35.6	25	27.8	57	63.3	12	26.1	18	39.1	30	65.2
	27	33	36.7	24	26.7	57	63.3	12	26.1	18	39.1	30	65.2
	28	32	35.6	24	26.7	56	62.2	13	28.3	17	37.0	30	65.2
8	29	32	35.6	25	27.8	57	63.3	11	23.9	19	41.3	30	65.2
	30	34	37.8	22	24.4	56	62.2	12	26.1	18	39.1	30	65.2
	31	35	38.9	23	25.6	58	64.4	11	23.9	19	41.3	30	65.2
	32	33	36.7	24	26.7	57	63.3	10	21.7	20	43.5	30	65.2

[a]Classification of Instructional Programs

[b]Partner states are those state labor market information (LMI) offices with which Research & Planning has data-sharing agreements: Alaska, Colorado, Idaho, Montana, Nebraska, New Mexico, Ohio, Oklahoma, South Dakota, Texas, and Utah.

Source: Workforce Data Quality Initiative (WDQI) custom extract.

Prepared by L. Mohondro, Research & Planning, WY DWS, 3/9/2017.

(Table continued on page 48)

(Table continued from page 47)

Table 3.5: 2006/07 Graduates from Selected Health Care & Related Professions (CIP[a] 51) Graduates from Wyoming Postsecondary Education Institution Working in WY and Partner States[b] by Program of Study

		Registered Nursing, Nursing Administration, Nursing Research & Clinical Nursing (CIP 5138; N=339)						Practical Nursing, Vocational Nursing, & Nursing Assistants (CIP 5139; N=179)					
		Wyoming		Partner States		Total		Wyoming		Partner States		Total	
Year After Grad.	Quarter After Grad.	N	%	N	%	N	%	N	%	N	%	N	%
0	0	218	64.3	19	5.6	237	69.9	118	65.9	9	5.0	127	70.9
1	1	223	65.8	37	10.9	260	76.7	126	70.4	15	8.4	141	78.8
	2	225	66.4	40	11.8	265	78.2	129	72.1	14	7.8	143	79.9
	3	220	64.9	46	13.6	266	78.5	134	74.9	15	8.4	149	83.2
	4	218	64.3	45	13.3	263	77.6	128	71.5	20	11.2	148	82.7
2	5	208	61.4	49	14.5	257	75.8	124	69.3	27	15.1	151	84.4
	6	203	59.9	49	14.5	252	74.3	125	69.8	29	16.2	154	86.0
	7	203	59.9	50	14.7	253	74.6	122	68.2	30	16.8	152	84.9
	8	204	60.2	49	14.5	253	74.6	122	68.2	29	16.2	151	84.4
3	9	202	59.6	46	13.6	248	73.2	120	67.0	29	16.2	149	83.2
	10	207	61.1	40	11.8	247	72.9	122	68.2	27	15.1	149	83.2
	11	205	60.5	43	12.7	248	73.2	119	66.5	27	15.1	146	81.6
	12	197	58.1	49	14.5	246	72.6	118	65.9	26	14.5	144	80.4
4	13	193	56.9	54	15.9	247	72.9	114	63.7	28	15.6	142	79.3
	14	194	57.2	50	14.7	244	72.0	112	62.6	29	16.2	141	78.8
	15	192	56.6	51	15.0	243	71.7	113	63.1	29	16.2	142	79.3
	16	188	55.5	53	15.6	241	71.1	108	60.3	32	17.9	140	78.2
5	17	177	52.2	56	16.5	233	68.7	105	58.7	32	17.9	137	76.5
	18	176	51.9	53	15.6	229	67.6	104	58.1	33	18.4	137	76.5
	19	174	51.3	50	14.7	224	66.1	107	59.8	31	17.3	138	77.1
	20	176	51.9	52	15.3	228	67.3	107	59.8	32	17.9	139	77.7
6	21	173	51.0	50	14.7	223	65.8	104	58.1	35	19.6	139	77.7
	22	169	49.9	55	16.2	224	66.1	101	56.4	31	17.3	132	73.7
	23	172	50.7	55	16.2	227	67.0	95	53.1	31	17.3	126	70.4
	24	172	50.7	55	16.2	227	67.0	96	53.6	31	17.3	127	70.9
7	25	168	49.6	61	18.0	229	67.6	94	52.5	33	18.4	127	70.9
	26	164	48.4	61	18.0	225	66.4	92	51.4	36	20.1	128	71.5
	27	161	47.5	63	18.6	224	66.1	92	51.4	37	20.7	129	72.1
	28	160	47.2	63	18.6	223	65.8	90	50.3	38	21.2	128	71.5
8	29	158	46.6	63	18.6	221	65.2	94	52.5	40	22.3	134	74.9
	30	158	46.6	70	20.6	228	67.3	93	52.0	38	21.2	131	73.2
	31	156	46.0	67	19.8	223	65.8	95	53.1	41	22.9	136	76.0
	32	152	44.8	67	19.8	219	64.6	91	50.8	42	23.5	133	74.3

[a]Classification of Instructional Programs

[b]Partner states are those state labor market information (LMI) offices with which Research & Planning has data-sharing agreements: Alaska, Colorado, Idaho, Montana, Nebraska, New Mexico, Ohio, Oklahoma, South Dakota, Texas, and Utah.

Source: Workforce Data Quality Initiative (WDQI) custom extract.

Prepared by L. Mohondro, Research & Planning, WY DWS, 3/9/2017.

(Table continued on page 49)

(Text continued from page 43)

be conducted.

Using the same research strategy as this article, future analysis will focus on all programs of study available at UW and the community colleges and how the graduates of each program impact the workforce. A single academic year's cohort was used in this article to examine a longer time period after graduation; however, the future analysis will require stacked cohorts to account for the small number of graduates from each program of study. The future research will look at the graduates by degrees awarded within each CIP code and the workforce outcomes of those graduates in Wyoming and partner states.

References

Glover, W. (2012). A decade later: Tracking Wyoming's youth into the labor force. Wyoming Department of Workforce Services, Research & Planning, Casper, WY. Retrieved November 30, 2016, from http://doe.state.wy.us/LMI/w_r_research/A_Decade_Later.pdf

Leonard, D. (2008). Wyoming statewide long-term employment projections 2006-2016. Wyoming Department

(Table continued from page 48)

Table 3.5: 2006/07 Graduates from Selected Health Care & Related Professions (CIP[a] 51) Graduates from Wyoming Postsecondary Education Institution Working in WY and Partner States[b] by Program of Study

		Other (N=119)					
		Wyoming		Partner States		Total	
Year After Grad.	Quarter After Grad.	N	%	N	%	N	%
0	0	86	72.3	6	5.0	92	77.3
1	1	82	68.9	5	4.2	87	73.1
	2	66	55.5	9	7.6	75	63.0
	3	72	60.5	8	6.7	80	67.2
	4	68	57.1	9	7.6	77	64.7
2	5	67	56.3	8	6.7	75	63.0
	6	67	56.3	7	5.9	74	62.2
	7	63	52.9	7	5.9	70	58.8
	8	68	57.1	10	8.4	78	65.5
3	9	68	57.1	12	10.1	80	67.2
	10	66	55.5	12	10.1	78	65.5
	11	63	52.9	9	7.6	72	60.5
	12	64	53.8	14	11.8	78	65.5
4	13	58	48.7	16	13.4	74	62.2
	14	59	49.6	19	16.0	78	65.5
	15	55	46.2	18	15.1	73	61.3
	16	56	47.1	19	16.0	75	63.0
5	17	58	48.7	21	17.6	79	66.4
	18	56	47.1	19	16.0	75	63.0
	19	57	47.9	18	15.1	75	63.0
	20	61	51.3	19	16.0	80	67.2
6	21	57	47.9	20	16.8	77	64.7
	22	56	47.1	20	16.8	76	63.9
	23	54	45.4	19	16.0	73	61.3
	24	50	42.0	24	20.2	74	62.2
7	25	52	43.7	22	18.5	74	62.2
	26	50	42.0	17	14.3	67	56.3
	27	51	42.9	19	16.0	70	58.8
	28	54	45.4	21	17.6	75	63.0
8	29	58	48.7	18	15.1	76	63.9
	30	58	48.7	19	16.0	77	64.7
	31	55	46.2	17	14.3	72	60.5
	32	54	45.4	20	16.8	74	62.2

[a]Classification of Instructional Programs

[b]Partner states are those state labor market information (LMI) offices with which Research & Planning has data-sharing agreements: Alaska, Colorado, Idaho, Montana, Nebraska, New Mexico, Ohio, Oklahoma, South Dakota, Texas, and Utah.

Source: Workforce Data Quality Initiative (WDQI) custom extract.

Prepared by L. Mohondro, Research & Planning, WY DWS, 3/9/2017.

of Workforce Services, Research & Planning, Casper, WY. Retrieved November 30, 2016 from http://doe.state.wy.us/LMI/LT_ind_0616.pdf

Mohondro, L. (2016). Chapter 4: Postsecondary education and labor market behavior. *Wyoming's Hathaway Scholarship Program: A Workforce Outcomes Evaluation of a State Merit-Based Scholarship Initiative Using Administrative Records.* Wyoming Department of Workforce Services, Research & Planning, Casper, WY. Retrieved April 10, 2017, from http://doe.state.wy.us/LMI/education_we_connect/hathaway2016/hathaway_ch4.htm

Moore, M. (2016). Wage records in Wyoming: Employment and earnings by age, gender, county, & industry, 2000-2015. *Wyoming Labor Force Trends, 53*(10). Retrieved December 14, 2016 from http://doe.state.wy.us/LMI/trends/1016/1016.pdf

National Skills Coalition. (2014, June). How many more skilled workers do we need? Using supply and demand reports for state workforce planning. Retrieved December 23, 2016 from http://www.nationalskillscoalition.org/resources/publications/file/how-many-more-skilled-workers.pdf

Saulcy, S., and Jones, S. (2009, February). A closer look at occupational projections for Wyoming, 2006-2016. Wyoming Department of Workforce Services, Research & Planning, Casper, WY. Retrieved April 10, 2017, from http://doe.state.wy.us/LMI/occ_proj_06_16/text.htm

Chapter 4: The Education and Career Pathways of Certified Nursing Assistants

by: Lynae Mohondro, Senior Economist

This chapter will look at the career pathways of certified nursing assistants (CNAs), and focus on those certified in Wyoming in 2010 and their role in the labor market.

The success of individuals in the workforce can vary based on decisions they make regarding education and training. A high school graduate who enrolls in postsecondary education will likely experience different outcomes than a high school graduate who goes directly into the workforce. Understanding typical routes or pathways to employment can help researchers and policymakers understand how different groups of individuals could use education, work experience, and training programs to improve their professional opportunities.

In This Chapter

The Workforce Innovation and Opportunity Act (WIOA) provides many definitions of a career pathway. Most applicable to this chapter, WIOA states that a career pathway "is a combination of rigorous and high quality education, training, and other services that … organizes education, training, and other services to meet the particular needs of an individual in a manner that accelerates the educational and career advancement of the individual to the extent practicable" (U.S. Department of Labor, 2014). **How well such planned strategies might perform depends on how well the naturally occurring pathways are understood.**

Considering the population being evaluated is as important as considering the outcomes of individuals who followed different paths in pathway evaluation (SWEAP, 2015). For example, a study of a population of high school graduates and non-high school graduates may not produce the same outcomes, regardless of the path taken. The Research & Planning (R&P) section of the Wyoming Department of Workforce Services recently produced Wyoming Career Assist, which provides demographic and employment data of University of Wyoming and Wyoming community college graduates working in Wyoming and 11 partner states[1] from five years prior to graduation to five years after graduation. Knowing the conditions of a population before an event, such as graduation from a training program, can help to understand the outcomes of the same population on similar career pathways. For more information on Wyoming Career Assist, go to http://doe.state.wy.us/LMI/education_we_connect/2017/consumer_reports_intro.htm.

Nursing Pathways

Direct care workers who provide long-term care made up 20.8% of the health care workforce in 2014 (GAO, 2016). These workers include home health aides, psychiatric aides, personal care aides, and nursing assistants. Difficulties in recruiting and retaining direct care workers and an aging population who need the services of direct care workers have increased concerns of a possible shortage of this portion of the workforce in the near future. Understanding the career pathways of the individuals in these occupations may shine a light on the root of the issue surrounding the shortage.

While students may withdraw from or enroll in any program that fits their current interests, one pathway that seems more natural is that of nursing occupations, or the progression from a CNA to a registered nurse (RN). For those individuals who would like to work in a nursing occupation, several licenses and certifications exist with varying education and training requirements. The most easily attainable certificate for a nursing occupation is for a CNA. According to O*Net Online (n.d.), a CNA may perform tasks such as feed, bathe, or change linens for patients while under supervision of an RN or licensed practical nurse (LPN).

In Wyoming, "an individual can only become a CNA by completing the Wyoming Department of Health approved educational program, successfully passing a national written and skills exam, applying and being granted certification. Once certified, a CNA can take additional coursework/test to expand to level two (CNA II) certification or Medication Aide-Certified (MA-CE)" (Burns, 2017). The minimum requirements to become a CNA include 75 hours of training, at least 16 of which must be in a classroom and 16 must be practical training (Knapp, 2017). Additional training and education allows the certified individual more responsibilities; for example, a CNA can obtain an associate's degree to become an RN and work without the supervision required as a CNA.

In 2012, R&P published dashboards that provided employment, Unemployment Insurance (UI), and Workers' Compensation data for CNAs, LPNs, and RNs working in the health care industry (NAICS 62) from third quarter 2009 (2009Q3) to third

1 States with which R&P has a data sharing agreement: Alaska, Colorado, Idaho, Montana, Nebraska, New Mexico, Ohio, Oklahoma, South Dakota, Texas, and Utah.

(Text continued on page 54)

Table 4.1: Certified Nursing Assistants (CNAs) Working in Health Care & Social Assistance (NAICS 62) in Wyoming, 2009-2015

Age Group	N and Column %	2009 Q1	2009 Q2	2009 Q3	2009 Q4	2010 Q1	2010 Q2	2010 Q3	2010 Q4	2011 Q1	2011 Q2	2011 Q3	2011 Q4
< 25	N	848	918	947	941	817	866	882	938	759	779	759	706
	%	26.3	27.7	28.6	28.6	24.8	25.8	26.5	27.5	24.5	25.4	25.4	24.6
25-34	N	879	902	888	875	946	948	935	956	912	890	863	825
	%	27.2	27.2	26.8	26.6	28.7	28.2	28.1	28.1	29.4	29.1	28.9	28.7
35-44	N	546	541	542	543	569	577	576	587	534	517	511	498
	%	16.9	16.3	16.3	16.5	17.3	17.2	17.3	17.2	17.2	16.9	17.1	17.4
45-54	N	563	564	562	555	543	555	527	530	483	472	464	453
	%	17.4	17.0	16.9	16.9	16.5	16.5	15.8	15.6	15.6	15.4	15.5	15.8
55-64	N	314	312	302	304	346	336	331	327	330	325	314	313
	%	9.7	9.4	9.1	9.2	10.5	10.0	10.0	9.6	10.6	10.6	10.5	10.9
65+	N	79	82	75	69	77	81	75	69	81	79	79	75
	%	2.4	2.5	2.3	2.1	2.3	2.4	2.3	2.0	2.6	2.6	2.6	2.6
Total	**N**	**3,229**	**3,319**	**3,316**	**3,287**	**3,298**	**3,363**	**3,326**	**3,407**	**3,099**	**3,062**	**2,990**	**2,870**
	%	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Age Group	N and Column %	2012 Q1	2012 Q2	2012 Q3	2012 Q4	2013 Q1	2013 Q2	2013 Q3	2013 Q4	2014 Q1	2014 Q2	2014 Q3	2014 Q4
< 25	N	574	576	553	941	840	913	923	878	733	740	723	954
	%	20.7	21.2	20.8	28.1	26.0	27.8	28.7	28.2	24.1	24.7	24.5	29.3
25-34	N	858	840	813	958	944	936	903	866	910	883	880	904
	%	31.0	30.9	30.6	28.6	29.2	28.5	28.1	27.9	29.9	29.4	29.8	27.7
35-44	N	494	486	486	564	583	586	577	564	562	556	544	559
	%	17.8	17.9	18.3	16.9	18.0	17.9	18.0	18.1	18.5	18.5	18.4	17.1
45-54	N	431	420	415	464	424	416	401	394	415	415	408	437
	%	15.6	15.4	15.6	13.9	13.1	12.7	12.5	12.7	13.6	13.8	13.8	13.4
55-64	N	326	318	312	338	354	349	335	329	336	326	313	317
	%	11.8	11.7	11.8	10.1	11.0	10.6	10.4	10.6	11.0	10.9	10.6	9.7
65+	N	88	80	74	82	86	82	75	77	87	82	81	89
	%	3.2	2.9	2.8	2.4	2.7	2.5	2.3	2.5	2.9	2.7	2.7	2.7
Total	**N**	**2,771**	**2,720**	**2,653**	**3,347**	**3,231**	**3,282**	**3,214**	**3,108**	**3,043**	**3,002**	**2,949**	**3,260**
	%	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Age Group	N and Column %	2015 Q1	2015 Q2	2015 Q3	2015 Q4
< 25	N	802	887	947	944
	%	26.1	28.1	29.8	29.9
25-34	N	896	894	882	867
	%	29.2	28.4	27.8	27.5
35-44	N	539	537	538	543
	%	17.6	17.0	16.9	17.2
45-54	N	413	421	412	405
	%	13.5	13.4	13.0	12.8
55-64	N	318	319	308	308
	%	10.4	10.1	9.7	9.8
65+	N	99	94	91	87
	%	3.2	3.0	2.9	2.8
Total	**N**	**3,067**	**3,152**	**3,178**	**3,154**
	%	**100.0**	**100.0**	**100.0**	**100.0**

[a]North American Industry Classification.

Source: Workforce Data Quality Initiative (WDQI) custom extract.

Prepared by L. Mohondro, Research & Planning, WY DWS, 3/21/17.

(Text continued from page 52)

quarter 2011 (2011Q3; Leonard, 2012); these dashboards are available online at http://doe.state.wy.us/LMI/nursing/2012/DASHBOARDS_COMPLETE_FEB2012.pdf. Table 4.1 (see page 53) provides some updated information from the 2012 dashboards and shows the number of CNAs who worked in Wyoming in health care & social assistance (NAICS 62) from 2009Q1 to 2015Q4 by age groups. In 2010Q3, just over one-fourth (26.5%) of the 3,326 CNAs working in Wyoming in health care & social assistance were under age 25. By 2015Q3, the percentage of CNAs under age 25 increased to 29.8% (of 3,178 CNAs). The percentage of CNAs age 65 and older also increased from 2010Q3 (2.3%) to 2015Q3 (2.9%); the percentage of all other age groups decreased. The decrease in percentages of those between the ages of 25 and 54 with an increase in the percentage of the younger age group indicates that as a whole, CNAs in Wyoming who worked in health care & social assistance became younger. Employers in this industry appear to rely on younger workers, such as those who get training right after high school, to fill their CNA positions.

Between 2009Q3 and 2011Q3, CNAs worked for the same primary employer in health care & social assistance for more than three and a half years on average, compared to RNs, who worked for the same primary employer in the health care industry for almost six years on average (Leonard, 2012). The high turnover of CNAs could be a result of those individuals returning to postsecondary education to obtain a higher degree, such as an LPN license or a degree in registered nursing. In addition, nursing students may use their CNA certification as a way to fund their education by working as a CNA while enrolled in postsecondary education.

To illustrate career pathways, Table 4.2 shows the educational outcomes for the 5,833 individuals that held a CNA certificate in Wyoming in 2010. Of those 5,833 CNAs, 50.5% enrolled in postsecondary education in Wyoming, either at the University of Wyoming or the community colleges, after they became certified as CNAs but before or during 2014/15, the most recent school year for which data are available (see Table 4.2). During this time, 1,763 (30.2%) individuals with a CNA certificate did not obtain another certificate or degree from a Wyoming postsecondary education institution. Individuals with CNA certificates who earned

Table 4.2: Enrollment in Wyoming Postsecondary Education Institution and Academic Achievement by 2015 of 2010 Certified Nursing Assistants (CNAs) Who Held Certificates in 2010 After Certificate Effective Date

Certified CNAs in 2010		Academic Achievement by 2015				
N	%	Enrolled	Certificate	Associate's	Bachelor's	Graduate
88	1.5	X	X			
223	3.8	X	X	X		
29	0.5	X	X	X	X	
506	8.7	X		X		
77	1.3	X		X	X	
5	0.1	X		X	X	X
241	4.1	X			X	
6	0.1	X			X	X
5	0.1	X				X
1,763	30.2	X				
8	0.1			X		
2,873	49.3					
9	0.2	Not discloseable due to confidentiality.				
5,833	**100.0**	**Total**				

Source: Workforce Data Quality Initiative (WDQI) custom extract.
Prepared by L. Mohondro, Research & Planning, WY DWS, 3/21/17.

an associate's degree (8.7%) and CNAs who earned a bachelor's degree (4.1%) made up the next most common academic achievements of all certified CNAs. These individuals may have returned to school to earn an associate's or bachelor's degree to increase their wages, or they may have been financing their degree by working as a CNA. Table 4.2 also shows the number and percentage of CNAs with other academic awards by 2015.

The degree a CNA obtains and whether or not that individual continues working in Wyoming or goes to work in a partner state results in different outcomes. Of all 5,833 individuals holding a CNA certificate in 2010, more than 75% worked either in Wyoming or a partner state from three years prior to becoming certified to five years after (see Table 4.3). One year after becoming certified, 89.6% of CNAs earned wages in Wyoming or a partner state. The median annual wage of these CNAs increased by over $9,000 (63.9%), from $14,759 three years before becoming certified to $24,189 five years after becoming certified.

For the purposes of this chapter, if an individual worked in Wyoming and a partner state in the same quarter, that individual is counted as working in the state in which he or she earned the highest wages. One year after becoming a CNA, 4,911 individuals (84.2%) earned wages in Wyoming (see Table 4.3). Overall, as with many other populations, the CNAs who held a certificate in 2010 gradually left Wyoming's workforce, and a greater percentage were found working in a partner state or could not be found working in Wyoming or a partner state (see Figure 4.1, page 56). By the fifth year after obtaining certification, 66.4% of CNAs from 2010 worked in Wyoming and earned an annual median wage of $24,766. The number of CNAs who worked in partner states nearly doubled from the first year after certification (318 individuals) to the fifth (631 individuals), and the number of individuals not found working in Wyoming or a partner state increased from 604 from 1,327. The time period five years after the 2010 CNA cohort became certified coincided with the time when coal, natural

Table 4.3: Longitudinal Tracking of CNAs Who Held Certificates in 2010 (N = 5,833): Employment and Wages from Wyoming and Partner States from 3 Years Before Certification Date to 5 Years After Certification Date

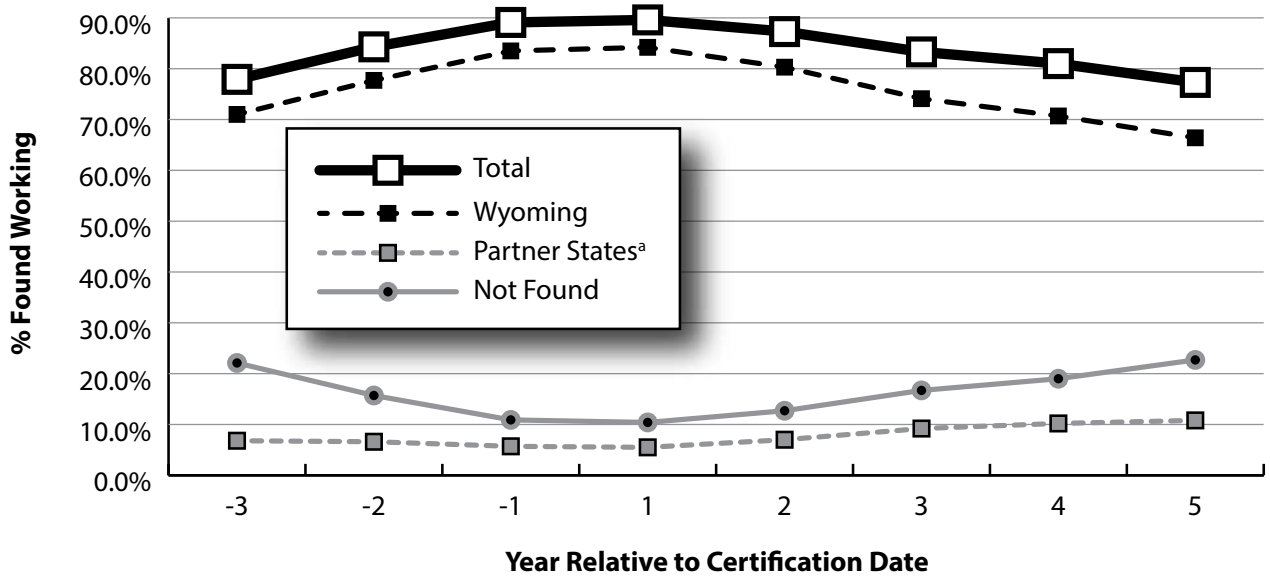
		Working in Wyoming				Working in Partner State				Total Found Working in WY or Partner State				Not Found Working	
Year[a]	Year Relative to Cert. Date	N	%	Median Annual Wage ($)	Wage % Change	N	%	Median Annual Wage ($)	Wage % Change	N	%	Median Annual Wage ($)	Wage % Change	N	%
2007	-3	4,144	71.0	15,151		399	6.8	11,022		4,543	77.9	14,759		1,290	22.1
2008	-2	4,534	77.7	16,104	6.3	383	6.6	10,935	-0.8	4,917	84.3	15,489	4.9	916	15.7
2009	-1	4,869	83.5	17,878	11.0	331	5.7	12,569	14.9	5,200	89.1	17,393	12.3	633	10.9
2011	1	4,911	84.2	18,218	1.9	318	5.5	11,647	-7.3	5,229	89.6	17,818	2.4	604	10.4
2012	2	4,684	80.3	19,189	5.3	409	7.0	13,875	19.1	5,093	87.3	18,744	5.2	740	12.7
2013	3	4,322	74.1	21,130	10.1	537	9.2	13,869	0.0	4,859	83.3	20,411	8.9	974	16.7
2014	4	4,125	70.7	22,844	8.1	597	10.2	16,281	17.4	4,722	81.0	22,084	8.2	1,111	19.0
2015	5	3,875	66.4	24,766	8.4	631	10.8	20,399	25.3	4,506	77.3	24,189	9.5	1,327	22.7

[a]Approximate year.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
Prepared by L. Mohondro, Research & Planning, WY DWS, 3/21/17.

gas, and oil prices dropped and triggered economic contraction in the state. With the data currently available to R&P, it is not known if the increase in CNAs working in partner states or not found is due to the downturn or other reasons.

Whether a CNA enrolls in postsecondary education and earns a degree after certification or not after affects his or her employment outcomes. As shown in Table 4.2, approximately half (2,873, or 49.3%) of all CNAs from the 2010 cohort did not enroll in postsecondary education after becoming certified in Wyoming. Five years after becoming certified, 35.7% (2,081) of CNAs never enrolled in postsecondary education, and earned an annual median wage of $24,859 (see Table 4.4, page 57). The CNAs who enrolled in postsecondary education in Wyoming but did not obtain a degree earned the lowest annual median wage ($20,419) five years after becoming certified.

Of all CNAs presented in Table 4.4 and shown in Figure 4.2 (see page 58), the CNAs who earned a certificate, an associate's degree, and a bachelor's degree between their date of certification and 2015 earned the lowest wages three years prior to certification. By the fifth year of holding a CNA certificate, these individuals made up just 0.6% of the cohort found working, but earned the highest annual median wage of $49,945. CNAs who obtained a bachelor's degree by 2015 made up 4.3% of the cohort found working and earned the second highest wage of $39,023. Table 4.4 also shows the employment and wage data for CNAs that



[a]Partner states are those state labor market information (LMI) offices with which Research & Planning has data-sharing agreements: Alaska, Colorado, Idaho, Montana, Nebraska, New Mexico, Ohio, Oklahoma, South Dakota, Texas, and Utah.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
Prepared by M. Moore, Research & Planning, WY DWS, 4/11/17.

Figure 4.1: **Longitudinal Tracking of CNAs Who Held a Certificate in 2010 (N = 5,833): Percent Working in Wyoming and Partner States from 3 Years Prior to Certification Date to 5 Years After Certification Date**

chose to obtain other academic awards by 2015. The wages presented in Tables 4.3 and 4.4 are nominal and do not account for inflation over the eight-year period.

By 2015, the majority (57.8%, or 3,370 individuals) of the 2010 CNA cohort no longer held a certificate or license from any licensing board in Wyoming (see Table 4.5, page 59).

Table 4.4: Longitudinal Tracking of CNAs Who Held a Certificate in 2010 (N = 5,833): Employment and Wages from Wyoming and Partner States[a] by Post-Certification Educational Attainment from UW/WCCC from 3 Years Before Certification Date to 5 Years After Certification Date

Approximate Year	Year Relative to Cert. Date		Total	Never Enrolled / No Degree	Enrolled / No Degree	Certificate Only	Associate's Only	Certificate & Associate's	Bachelor's Only	Associate's & Bachelor's	Certificate & Associate's & Bachelor's	Other Pathway
2007	-3	N	4,543	2,395	1,280	74	382	175	152	52	20	13
		Row %	100.0	52.7	28.2	1.6	8.4	3.9	3.3	1.1	0.4	0.3
		Median Annual Wage ($)	14,759	18,675	10,343	11,690	9,326	11,748	4,505	8,196	3,725	12,343
2008	-2	N	4,917	2,525	1,411	76	422	194	187	63	23	16
		%	100.0	51.4	28.7	1.5	8.6	3.9	3.8	1.3	0.5	0.3
		Median Annual Wage ($)	15,489	19,723	11,986	12,435	10,882	12,863	4,996	6,353	6,309	14,753
2009	-1	N	5,200	2,635	1,531	78	449	198	198	68	25	18
		%	100.0	50.7	29.4	1.5	8.6	3.8	3.8	1.3	0.5	0.3
		Median Annual Wage ($)	17,393	21,403	13,954	14,985	12,792	14,867	5,702	8,329	9,198	12,219
2011	1	N	5,229	2,584	1,592	80	450	204	210	66	24	19
		%	100.0	49.4	30.4	1.5	8.6	3.9	4.0	1.3	0.5	0.4
		Median Annual Wage ($)	17,818	21,791	14,354	16,345	13,798	15,075	5,769	8,555	15,743	13,282
2012	2	N	5093	2,456	1,575	82	455	211	205	69	23	17
		%	100.0	48.2	30.9	1.6	8.9	4.1	4.0	1.4	0.5	0.3
		Median Annual Wage ($)	18,744	22,721	16,794	17,584	15,362	16,165	7,255	9,846	10,935	12,593
2013	3	N	4,859	2,296	1,523	77	443	203	206	67	25	19
		%	100.0	47.3	31.3	1.6	9.1	4.2	4.2	1.4	0.5	0.4
		Median Annual Wage ($)	20,411	23,467	17,919	20,199	19,436	21,899	11,893	14,374	13,853	14,187
2014	4	N	4,722	2,207	1,466	75	454	207	202	66	27	18
		%	100.0	46.7	31.0	1.6	9.6	4.4	4.3	1.4	0.6	0.4
		Median Annual Wage ($)	22,084	23,684	18,451	24,618	23,842	25,030	28,660	26,758	37,107	29,097
2015	5	N	4,506	2,081	1,400	74	441	206	195	67	26	16
		%	100.0	46.2	31.1	1.6	9.8	4.6	4.3	1.5	0.6	0.4
		Median Annual Wage ($)	24,189	24,859	20,419	24,719	28,247	33,170	39,023	35,823	49,945	33,015

[a]Partner states are those states with which R&P has data sharing agreements: Alaska, Colorado, Idaho, Montana, Nebraska, New Mexico, Ohio, Oklahoma, South Dakota, Texas, and Utah.

Educational achievements are mutually exclusive of each other.

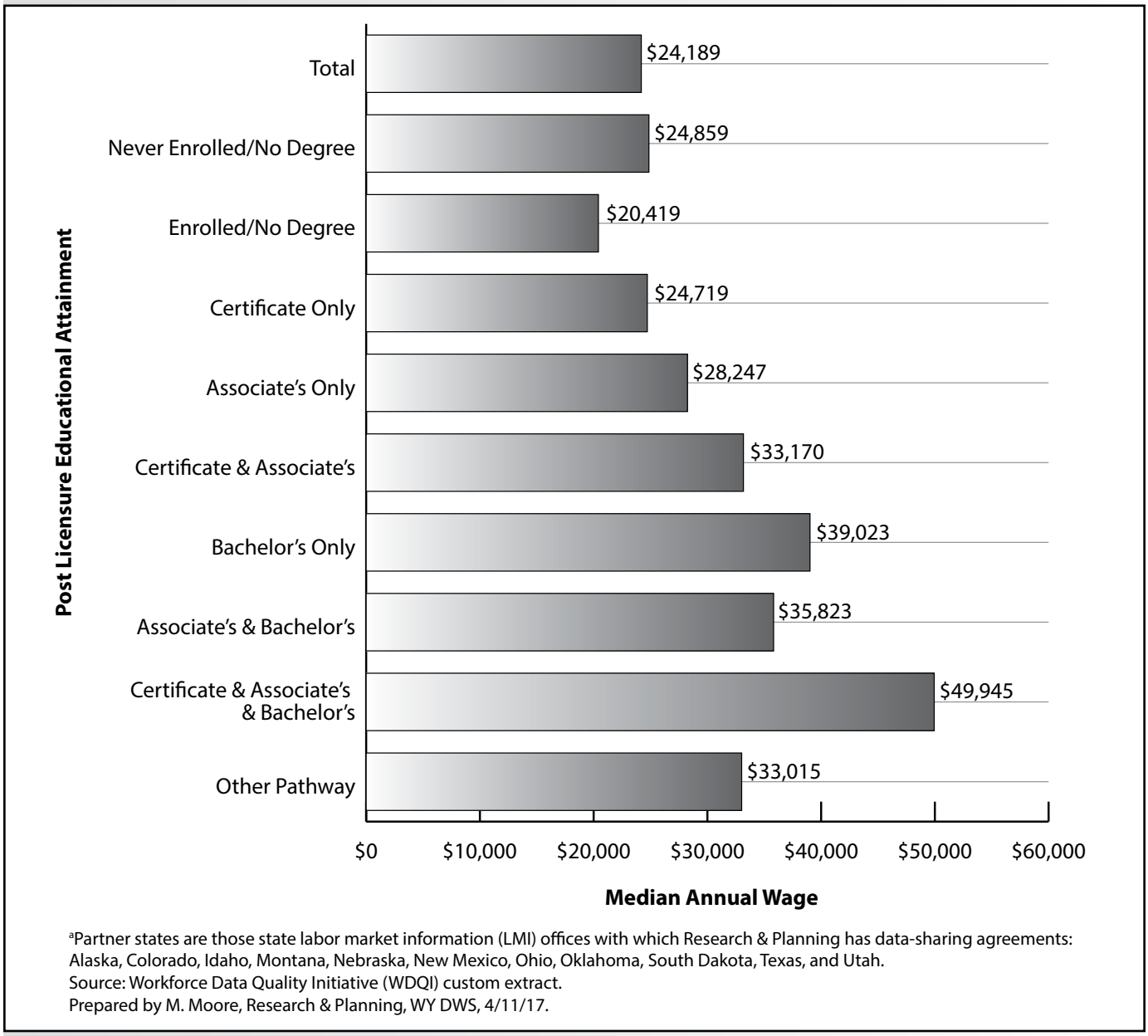
Other degree achievements not represented in table are accounted for in Totals.

Source: Workforce Data Quality Initiative (WDQI) custom extract.

Prepared by L. Mohondro, Research & Planning, WY DWS, 3/21/17.

Overall, almost 70% of the entire cohort took a different career path, whether that included becoming licensed in another area of health care other than as a CNA or going to work in a different industry entirely. By 2015, only 30.7% (1,792 individuals) of the 2010 CNA cohort still held a CNA certificate as their highest license, while almost 10% went on to obtain a license in another type of nursing: 8.6% became licensed as an RN and 1.3% became licensed as an LPN or vocational nurse. Table 4.5 also lists other licenses held by the individuals from the 2010 CNA cohort in the health care industry.

Although 3,370 individuals from the 2010 CNA cohort no longer held a certificate or license from a licensing board in Wyoming in 2015, many continued working in health care (756 individuals) and in Wyoming (1,313



[a]Partner states are those state labor market information (LMI) offices with which Research & Planning has data-sharing agreements: Alaska, Colorado, Idaho, Montana, Nebraska, New Mexico, Ohio, Oklahoma, South Dakota, Texas, and Utah.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
Prepared by M. Moore, Research & Planning, WY DWS, 4/11/17.

Figure 4.2: **Longitudinal Tracking of CNAs Who Held a Certificate in 2010: Median Annual Wage 5 Years after Certification by Post-Certification Educational Attainment for Individuals Working in Wyoming and Partner States[a]**

individuals). Table 4.6 shows the industries and state in which individuals from the 2010 CNA cohort worked in 2015 if they did not hold a certificate or license in 2015. Of the 756 individuals still working in health care, 342 (45.2%) worked in a partner state. These individuals may have obtained CNA jobs in another state and no longer needed to remain certified in Wyoming. After health care and social assistance, CNAs from the 2010 CNA cohort who were not certified or licensed in 2015 worked in retail trade, accommodation & food services, and educational services. Of the 3,370 individuals from the 2010 CNA cohort, 1,475 (43.8%) did not work in Wyoming or the 11 partner states.

Table 4.5: **2015 Licenses/Certificates of Nursing Assistants (CNAs) Who Were Certified in Wyoming in 2010 (Total N = 5,833)**

SOC[a] Code	SOC Title	N	%
311014	Nursing Assistants (CNAs)	1,792	30.7
291141	Registered Nurses	501	8.6
292061	Licensed Practical & Licensed Vocational Nurses	76	1.3
292052	Pharmacy Technicians	23	0.4
292034	Radiologic Technologists	15	0.3
319091	Dental Assistants	13	0.2
291122	Occupational Therapists	10	0.2
211029	Social Workers, All Other	9	0.2
292021	Dental Hygienists	6	0.1
	Other Occupations	20	0.3
	Not in Licensing Files	3,370	57.8

[a]Standard Occupational Classification.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
Prepared by L. Mohondro, Research & Planning, WY DWS, 3/21/17.

Table 4.6: **Primary Industry and State of Work in 2015 of Nursing Assistants (CNAs) Certified in 2010 who No Longer Had a Certificate or License in 2015**

NAICS[a] Code	NAICS	Wyoming	Partner States	Total
62	Health Care & Social Assistance	414	342	756
44-45	Retail Trade	163	46	209
72	Accomodation & Food Services	161	29	190
61	Educational Services	127	30	157
92	Public Administration	97	13	110
56	Administrative & Support & Waste Management & Remediation Services	52	37	89
81	Other Services (Except Public Administration)	63	11	74
52	Finance & Insurance	39	9	48
31-33	Manufacturing	23	17	40
48-49	Transportation & Warehousing	34	5	39
21	Mining	ND	ND	37
23	Construction	ND	ND	33
54	Professional, Scientific, & Technical Services	20	11	31
53	Real Estate & Leasing	16	6	22
71	Arts, Entertainment, & Recreation	14	6	20
42	Wholesale Trade	ND	ND	18
51	Information	ND	ND	6
	Other NAICS			16
	Total	**1,313**	**582**	**1,895**
	Not found			1,475

[a]North American Industry Classification.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
Prepared by L. Mohondro, Research & Planning, WY DWS, 3/21/17.

Possible Reasons for Change

A natural progression towards becoming an RN starts with a CNA certificate. While 8.6% (501 individuals) of the 2010 CNA cohort did obtain an RN license by 2015, the majority (57.8%, or 3,370 individuals) did not have a certificate or license in Wyoming at all. In addition, a relatively high percentage of those individuals went to work in lower paying industries in 2015 (retail trade and accommodation & food services; see Table 4.6). The reasons why the majority of the CNAs in the

2010 cohort did not continue working as CNAs or obtain a higher health care license are unknown. One issue encouraging CNAs to leave the health care industry could be workplace safety. As discussed in Chapter 7 of this publication, CNAs had the highest incidence rate of workplace injuries in the health care industry. Although there could be many other reasons why CNAs do not remain certified, the movement of former CNAs into the lower paying industries of retail trade and accommodation & food services suggests that wages may not be a common reason. Future pathway evaluations may provide a better understanding of why so many CNAs do not enter into higher paying licensed occupations in the health care industry.

Conclusion

Analyzing different career pathways of populations provides a better understanding of the population's role in the workforce and what leads to successful outcomes. For example, individuals interested in working in a nursing occupation have many options for education and training. CNAs who eventually obtain a degree earn much higher wages than those who do not enroll in postsecondary education and those who enroll but do not earn a degree. Understanding the conditions of the economy also allows for a better understanding of why certain populations follow the paths that they do, such as going to work in a partner state or enrolling in postsecondary education during a time of economic contraction.

In addition, policymakers can use career pathways to understand shortages of occupations to produce successful solutions to the issues. For example, as noted earlier, concerns of a shortage of direct care workers exist (GAO, 2016). However, in Wyoming, many people train to acquire the skills to obtain certification as a CNA, but most do not remain certified as CNAs five years later.

Similar studies to the one in this chapter may apply to the natural pathways of other occupations as well. Future pathway evaluations will analyze different populations over time to identify student pathways that lead to success.

References

Government Accountability Office. (August, 2016). *Long-Term Care Workforce: Better Information Needed on Nursing Assistants, Home Health Aides, and Other Direct Care Workers.* Retrieved April 17, 2017 from http://www.gao.gov/assets/680/679100.pdf

Knapp, L. (personal communication, March 28, 2017).

Burns, J. (personal communication, May 30, 2017).

Leonard, D. (2012). Dashboard: Nursing employment in Wyoming. Retrieved March 28, 2017, from http://doe.state.wy.us/LMI/nursing/2012/DASHBOARDS_COMPLETE_FEB2012.pdf.

O*NET Online. (n.d.) Summary report for: 31-1014.00 - nursing assistants. Retrieved April 6, 2017, from https://www.onetonline.org/link/summary/31-1014.00

U.S. Department of Labor. (2014). Workforce Innovation and Opportunity Act, H.R. 803 §3(7)(E), 2014. Retrieved April 11, 2017, from https://www.doleta.gov/wioa/

Chapter 5: Analysis of Licensed Health Care Occupations

by: Matthew Halama, Economist

The research presented in this chapter will describe to potential workers, employers, and the general public how licensed health care occupational staffing levels, hours worked, and demographics have changed between 2010Q3 to 2015Q3 in Wyoming. This chapter pays particular attention to the urban/rural distribution of health care workers with implications for the availability of health care services for an aging rural population.

The information discussed in this article is presented in terms of persons working who were licensed for a particular occupation.

As discussed in Chapter 2 of this publication, an aging population requires more health care services. This chapter follows up on that by looking at the demographics of persons working in licensed health care occupations in Wyoming.

Research and Planning (R&P) compared the age distribution of individuals who were licensed to work in health care occupations and who were paid wages

In This Chapter

for 2010Q3 and 2015Q3, as well as the median wages and median hours worked of licensed occupations in urban and rural counties within different industries in 2015Q3. Industries are defined by the North American Industrial Classification System (NAICS).

This research is a first among labor market information shops in the country and in doing this research, R&P is laying groundwork that can be replicated and improved upon.

Literature Review

In 2016, the state of Wyoming published a new Unified Plan in accordance with the Workforce Innovation and Opportunity Act (WIOA)[1], which is intended to promote national economic growth by improving employment, training, and education programs in the U.S. (State of Wyoming, 2016). The Unified Plan contained a sector analysis of health care & social assistance (NAICS 62), among other industries. The analysis included employment projections, demographic information, occupational breakdown, replacement need, and future influences on the health care & social assistance industry. A replacement need analysis in the Unified Plan listed the total number of persons working and those ages 55 and older in licensed health care occupations working in health care & social assistance in 2014Q3.

As noted in the Unified Plan (p. 15), health care & social assistance has a high percentage of workers age 55 and older (21.4%) and a high percentage of workers with a bachelor's degree or higher (31.2%). At the occupational level within health care & social assistance, counselors, all other (SOC 21-1019) had the highest proportion of individuals ages 55 and older (36.8%) among licensed health care occupations in health care & social assistance, followed by physicians and surgeons, all other (SOC 29-1069) at 34.4%, and licensed practical & vocational nurses (SOC 29-2061) at 33.3% (State of Wyoming, 2016, p.31).

Methodology

As previously discussed in this publication, wage records represent an individual's wage history based on employers' quarterly wage and employment reports to the Unemployment Insurance (UI) tax section of the Wyoming Department of Workforce Services. For the research presented in this chapter, R&P was able to utilize its Wage Records database in order to determine the number of persons working in Wyoming in 2015Q3 and calculate the median wages and hours worked. Additionally, by linking wage records to health care files obtained through memoranda of understanding with Wyoming's state licensing boards[2], R&P was able to gain an understanding of how the distribution of Wyoming's health care delivery system changed from 2010Q3 to 2015Q3.

The distributions of licensed occupations were created by linking wage records with state licensing data. By using employer location and weekly

1 Wyoming's Unified Plan is available at http://wyowdc.wyo.gov/unified-state-plan-1.

2 These memoranda of understanding are available at http://doe.state.wy.us/LMI/education_we_connect.htm#mou.

hours worked, R&P can compare total employment and hours worked between urban and rural areas in Wyoming. The U.S. Census Bureau defines *rural* as all population, housing, and territory not included within an urbanized area or urban cluster. *Urban areas* are defined as areas with 50,000 or more people, and *urban clusters* are areas with at least 2,500 but fewer than 50,000 people (Ratcliffe et al., 2016). The U.S. Bureau of Labor Statistics defines a micropolitan area as one or more urban clusters with a population of at least 10,000 but less than 50,000 (Helmer 2008). For the purposes of this research, R&P used the Census Bureau's definition of rural combined with Bureau of Labor Statistics definition for urban cluster; a list of Wyoming's counties based on rural and urban designation is presented in Table 5.1.

Table 5.1: **Urban and Rural Counties in Wyoming**

Urban	Rural
Albany	Big Horn
Campbell	Carbon
Laramie	Converse
Natrona	Crook
Park	Fremont
Sheridan	Goshen
Sweetwater	Hot Springs
Teton	Johnson
Uinta	Lincoln
	Niobrara
	Platte
	Sublette
	Washakie
	Weston

One important distinction should be noted before reading the results presented in this chapter. Tables 5.4 and 5.5 include the possibility that an individual can work in both a rural and urban area by having multiple jobs. The sum of urban and rural areas by occupation may not necessarily equal the statewide total, since individuals statewide are counted once. For the tables illustrating employment distribution percentages, the numbers for both urban and rural are summed, which would be equal to or larger than the statewide number because some are employed in both areas, but this method will still give a percentage equal to 100.

Results and Discussion

As shown in Table 5.2 (see page 64), the total number of persons working in licensed health care occupations in Wyoming increased from 15,725 in 2010Q3 to 17,558 in 2015Q3 (1,833, or 11.7%). It is important to note that Table 5.2 shows licensed health care occupations across all industries, not just in health care & social assistance; for example, nurses can work in schools. The largest increase in the number of persons working was seen in registered nurses, from 4,899 in 2010Q3 to 5,625 in 2015Q3 (726, or 14.8%). The greatest decrease was seen among nursing assistants (CNAs), from 4,323 in 2010Q3 to 4,149 in 2015Q3 (-174, or -4.0%). Physicians and surgeons, all other, increased 42.4% (78 individuals) from 184 to 262. Physicians and surgeons, all other, are those with specialized medical training, such as cardiologists or neurosurgeons.

While employment in licensed health care occupations increased overall, the statewide distribution of licensed health care occupations between urban and rural areas was relatively unchanged between 2010Q3 and 2015Q3. In 2010Q3, 74.5% of licensed health care occupations were found in urban areas, compared to 75.4% in 2015Q3. Likewise, the proportion of licensed health care occupations found in rural areas was largely unchanged, from 25.5% to 24.6%.

The change in the gender composition of licensed health care occupations was negligible between 2010Q3 and 2015Q3. In 2010Q3, females comprised 83.1% of the licensed health care workforce; by 2015Q3, that number declined slightly to 82.6%. The percentage of males in licensed health care occupations increased slightly, from 16.9% to 17.4%. Furthermore, there was little change in the gender ratio for

Table 5.2: **Total Number of Persons Working in Licensed Health Care Occupations Across All Industries in Wyoming, 2010Q3 and 2015Q3**

SOC[a] Code	SOC Title	2010Q3 N	2010Q3 Column %	2015Q3 N	2015Q3 Column %	Change, 2010Q3-2015Q3 N	Change, 2010Q3-2015Q3 %
19-3031	Clinical, Counseling, & School Psychologists	101	0.6	86	0.5	-15	-14.9
21-1011	Substance Abuse & Behavioral Disorder Counselors	55	0.3	75	0.4	20	36.4
21-1013	Marriage & Family Therapists	46	0.3	53	0.3	7	15.2
21-1019	Counselors, All Other	385	2.4	553	3.1	168	43.6
21-1029	Social Workers, All Other	296	1.9	408	2.3	112	37.8
29-1011	Chiropractors	69	0.4	82	0.5	13	18.8
29-1021	Dentists, General	183	1.2	215	1.2	32	17.5
29-1041	Optometrists	71	0.5	81	0.5	10	14.1
29-1051	Pharmacists	579	3.7	566	3.2	-13	-2.2
29-1061	Anesthesiologists	45	0.3	49	0.3	4	8.9
29-1062	Family & General Practitioners	242	1.5	224	1.3	-18	-7.4
29-1063	Internists, General	117	0.7	145	0.8	28	23.9
29-1064	Obstetricians & Gynecologists	56	0.4	62	0.4	6	10.7
29-1065	Pediatricians, General	42	0.3	49	0.3	7	16.7
29-1066	Psychiatrists	34	0.2	34	0.2	0	0.0
29-1067	Surgeons	126	0.8	133	0.8	7	5.6
29-1069	Physicians & Surgeons, All Other	184	1.2	262	1.5	78	42.4
29-1071	Physician Assistants	N/D	N/D	203	1.2	N/D	N/D
29-1081	Podiatrists	12	0.1	13	0.1	1	8.3
29-1122	Occupational Therapists	308	2.0	361	2.1	53	17.2
29-1123	Physical Therapists	309	2.0	385	2.2	76	24.6
29-1126	Respiratory Therapists	236	1.5	257	1.5	21	8.9
29-1127	Speech-Language Pathologists	209	1.3	312	1.8	103	49.3
29-1141	Registered Nurses	4,899	31.2	5,625	32.0	726	14.8
29-1181	Audiologists	26	0.2	24	0.1	-2	-7.7
29-2021	Dental Hygienists	332	2.1	411	2.3	79	23.8
29-2034	Radiologic Technologists & Technicians	482	3.1	625	3.6	143	29.7
29-2052	Pharmacy Technicians	641	4.1	743	4.2	102	15.9
29-2061	Licensed Practical & Licensed Vocational Nurses	784	5.0	724	4.1	-60	-7.7
29-2092	Hearing Aid Specialists	11	0.1	11	0.1	0	0.0
31-1014	Nursing Assistants (CNAs)	4,323	27.5	4,149	23.6	-174	-4.0
31-2021	Physical Therapist Assistants	112	0.7	171	1.0	59	52.7
31-9091	Dental Assistants	337	2.1	400	2.3	63	18.7
39-4011	Embalmers	N/D	N/D	N/D	N/D	N/D	N/D
39-4031	Morticians, Undertakers, & Funeral Directors	N/D	N/D	N/D	N/D	N/D	N/D
	Total	**15,725**	**100.0**	**17,558**	**100.0**	**1,833**	**11.7**

[a]Standard Occupational Classification.
N/D = Not discloseable due to confidentiality.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
Revised by M. Halama and M. Moore, Research & Planning, WY DWS, 4/6/17.

urban and rural areas. Males made up 17.4% licensed health care occupations in urban areas in 2010Q3 compared to 17.6% in 2015Q3, and 15.4% in rural areas in 2010Q3 compared to 17.6% in 2015Q3.

Table 5.3 shows the employment distribution of licensed health care

Table 5.3: Total Number of Persons Working in Licensed Health Care Occupations in Health Care & Social Assistance (NAICS[a] 62) in Wyoming, 2010Q3 and 2015Q3

SOC[b] Code	SOC Title	2010Q3 N	2010Q3 Column %	2015Q3 N	2015Q3 Column %	Change, 2010Q3-2015Q3 N	Change, 2010Q3-2015Q3 %
19-3031	Clinical, Counseling, & School Psychologists	60	0.5	53	0.4	-7	-11.7
21-1011	Substance Abuse & Behavioral Disorder Counselors	39	0.3	54	0.4	15	38.5
21-1013	Marriage & Family Therapists	33	0.3	32	0.2	-1	-3.0
21-1019	Counselors, All Other	234	1.9	351	2.6	117	50.0
21-1029	Social Workers, All Other	207	1.7	282	2.1	75	36.2
29-1011	Chiropractors	65	0.5	77	0.6	12	18.5
29-1021	Dentists, General	175	1.4	209	1.5	34	19.4
29-1041	Optometrists	70	0.6	80	0.6	10	14.3
29-1051	Pharmacists	138	1.1	159	1.2	21	15.2
29-1061	Anesthesiologists	45	0.4	49	0.4	4	8.9
29-1062	Family & General Practitioners	186	1.5	197	1.4	11	5.9
29-1063	Internists, General	113	0.9	139	1.0	26	23.0
29-1064	Obstetricians & Gynecologists	54	0.4	58	0.4	4	7.4
29-1065	Pediatricians, General	41	0.3	48	0.3	7	17.1
29-1066	Psychiatrists	29	0.2	31	0.2	2	6.9
29-1067	Surgeons	124	1.0	132	1.0	8	6.5
29-1069	Physicians & Surgeons, All Other	180	1.5	244	1.8	64	35.6
29-1071	Physician Assistants	N/D	N/D	194	1.4	N/D	N/D
29-1081	Podiatrists	12	0.1	13	0.1	1	8.3
29-1122	Occupational Therapists	236	1.9	276	2.0	40	16.9
29-1123	Physical Therapists	293	2.4	367	2.7	74	25.3
29-1126	Respiratory Therapists	213	1.7	230	1.7	17	8.0
29-1127	Speech-Language Pathologists	134	1.1	191	1.4	57	42.5
29-1141	Registered Nurses	4,153	34.1	4,796	34.9	643	15.5
29-1181	Audiologists	18	0.1	15	0.1	-3	-16.7
29-2021	Dental Hygienists	312	2.6	380	2.8	68	21.8
29-2034	Radiologic Technologists & Technicians	448	3.7	594	4.3	146	32.6
29-2052	Pharmacy Technicians	128	1.1	168	1.2	40	31.3
29-2061	Licensed Practical & Licensed Vocational Nurses	689	5.7	616	4.5	-73	-10.6
29-2092	Hearing Aid Specialists	N/D	N/D	N/D	N/D	N/D	N/D
31-1014	Nursing Assistants	3,325	27.3	3,177	23.1	-148	-4.5
31-2021	Physical Therapist Assistants	110	0.9	158	1.1	48	43.6
31-9091	Dental Assistants	302	2.5	362	2.6	60	19.9
39-4011	Embalmers	N/D	N/D	N/D	N/D	N/D	N/D
39-4031	Morticians, Undertakers, & Funeral Directors	N/D	N/D	N/D	N/D	N/D	N/D
	Total	**12,177**	**100.0**	**13,741**	**100.0**	**1,564**	**12.8**

[a]North American Industry Classification.
[b]Standard Occupational Classification
N/D = Not discloseable due to confidentiality.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
Prepared by M. Halama, Research & Planning, WY DWS, 4/4/17.

occupations specifically in health care & social assistance (NAICS 62). Statewide in 2015Q3, registered nurses accounted for 34.9% of all licensed health care occupations in health care & social assistance, while CNAs accounted for 23.1%, and licensed practical & vocational nurses accounted for 4.5%.

Health Care in Urban and Rural Areas

Table 5.4 details selected licensed health care occupations in health care & social assistance (NAICS 62) in urban and rural areas as well as statewide in Wyoming in 2010Q3 and 2015Q3. In 2015Q3, the majority of workers in licensed health care occupations were employed in urban areas (N = 10,550) compared to rural areas (N = 3,358). The median hourly wage was higher for workers in urban areas ($25.09) than in rural areas ($24.16). The median hours worked were also higher for those in urban areas (492) compared to rural areas (473). In some instances, however, wages were higher for individuals in rural areas; for example, the median hourly wage for

Table 5.4: Number, Median Hourly Wage, and Median Hours Worked[a] for Individuals Working in Selected Licensed Health Care Occupations in Health Care & Social Assistance (NAICS[b] 62) in Wyoming by Rural and Urban Areas, 2010Q3 and 2015Q3

		2010Q3											
		Statewide				Rural				Urban			
SOC[c] Code	Title	N	Col %	Median Wage ($)	Median Hours	N	Col %	Median Wage ($)	Median Hours	N	Col %	Median Wage ($)	Median Hours
29-1141	Registered Nurses	4,153	34.1	28.19	520	962	31.4	29.71	520	3,253	35.1	27.87	518
29-1051	Pharmacists	138	1.1	48.21	513	26	0.8	50.91	467	113	1.2	47.93	520
31-1014	Nursing Assistants	3,325	27.3	12.94	437	945	30.8	12.58	420	2,433	26.2	13.04	435
31-2021	Physical Therapist Assistants	110	0.9	22.89	491	37	1.2	25.01	443	73	0.8	22.62	507
	Total	**12,177**	**100.0**	**22.21**	**494**	**3,068**	**100.0**	**21.88**	**486**	**9,280**	**100.0**	**22.20**	**491**

		2015Q3											
		Statewide				Rural				Urban			
SOC[c] Code	Title	N	Col %	Median Wage ($)	Median Hours	N	Col %	Median Wage ($)	Median Hours	N	Col %	Median Wage ($)	Median Hours
29-1141	Registered Nurses	4,796	34.9	29.54	509	1,024	30.5	30.78	474	3,838	36.4	29.20	512
29-1051	Pharmacists	159	1.2	55.47	520	29	0.9	66.47	444	132	1.3	53.07	520
31-1014	Nursing Assistants	3,177	23.1	13.68	439	922	27.5	13.81	430	2,285	21.7	13.58	440
31-2021	Physical Therapist Assistants	158	1.1	23.49	514	44	1.3	23.99	486	115	1.1	23.49	521
	Total	**13,741**	**100.0**	**24.98**	**488**	**3,358**	**100.0**	**24.16**	**473**	**10,550**	**100.0**	**25.09**	**492**

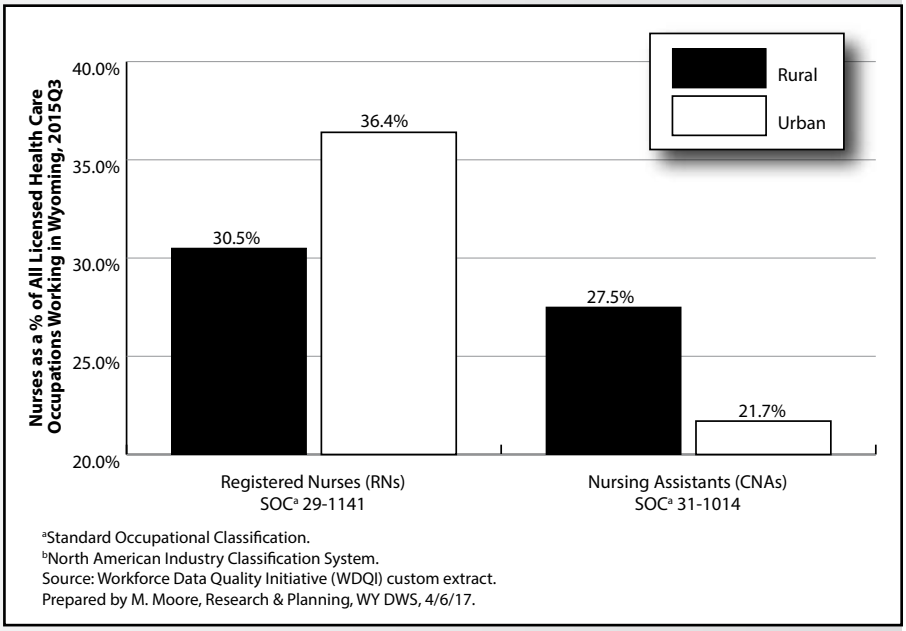
[a]520 hours = 40 hours per week.
[b]North American Industry Classification System.
[c]Standard Occupational Classification.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
Prepared by M. Halama, Research & Planning, WY DWS, 4/4/17.

pharmacists in rural areas was $66.47 compared to $53.07 for pharmacists in urban areas.

Figure 5.1 shows registered nurses made up a greater proportion of all licensed health care occupations in urban areas in Wyoming in 2015Q3, while CNAs made up a greater proportion in rural areas. Registered nurses made up 36.4% of all licensed health care occupations in urban areas, compared to 30.5% for rural areas. By comparison, RNs made up 27.5% of all licensed health care occupations in rural areas, compared to 21.7% in urban areas.

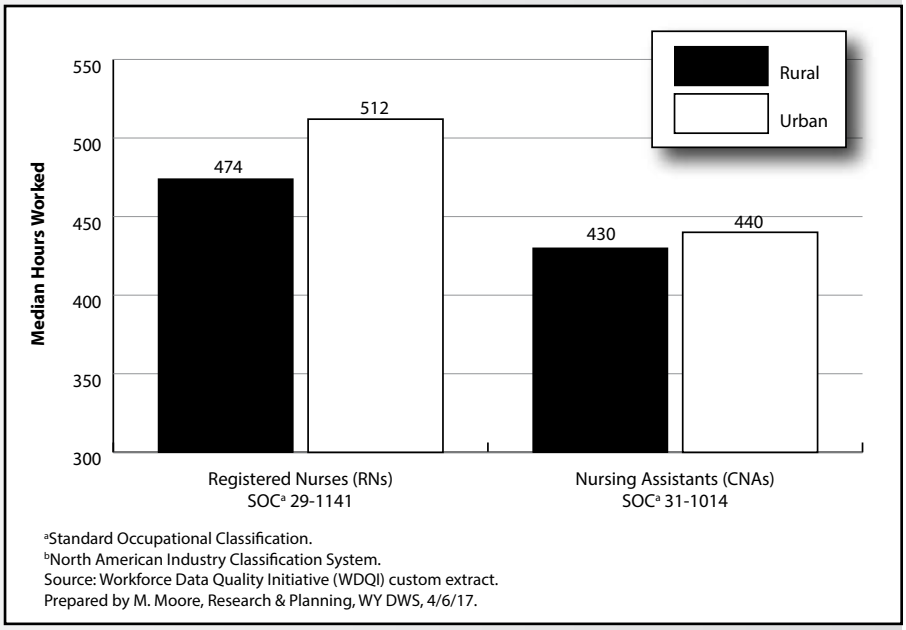
Figure 5.2 shows the median hours worked for registered nurses and CNAs in urban and rural areas in Wyoming in 2015Q3. The median number of hours worked for registered nurses in urban areas was 512, compared to 474 in rural areas. The difference in the median number of hours worked for CNAs in urban (440) and rural (430) areas was much less pronounced.

Table 5.5 (see pages 68-69) shows the change in the number of persons working in licensed occupations in health care & social assistance in rural and urban areas from 2010Q3 to 2015Q3. The greatest percentage changes among rural health care workers were physicians & surgeons, all other (92.9%); speech-language pathologists (67.7%); counselors, all



[a]Standard Occupational Classification.
[b]North American Industry Classification System.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
Prepared by M. Moore, Research & Planning, WY DWS, 4/6/17.

Figure 5.1: Nurses as a Percentage of Individuals Working in All Licensed Health Care Occupations in Health Care & Social Assistance (NAICS[b] 62) in Wyoming, 2015Q3



[a]Standard Occupational Classification.
[b]North American Industry Classification System.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
Prepared by M. Moore, Research & Planning, WY DWS, 4/6/17.

Figure 5.2: Median Quarterly Hours Worked by Registered Nurses (RNs) and Nursing Assistants (CNAs) in Health Care & Social Assistance (NAICS[b] 62) in Rural and Urban Areas in Wyoming, 2015Q3

other (47.0%); physical therapists (45.7%); and surgeons (42.9%). Many of these large percentage changes were due to a small number of licensed health care occupations in rural areas; for example, the 92.9% increase in physicians & surgeons, all other, represented a growth of 13 individuals, from 14 in 2010Q3 to 27 in 2015Q3.

In urban areas, the greatest increases from 2010Q3 to 2015Q3 were seen in physical therapist assistants (57.5%); counselors, all other (53.6%); social workers, all other (44.9%); and radiologic technologists & technicians (35.8%).

Older Workers in Health Care

As discussed in Chapter 2, the median age of Wyoming's population remained unchanged at 36.9 from 2010 to 2015, due to an increase in the number of millennials and a decrease in the number of baby boomers. The median age for Wyoming's health care workforce decreased from 41 in 2010Q3 to 40 in 2015Q3, according to state licensing board files. Some licensed health care occupations, however, have a relatively large proportion of individuals ages 55 and older who will reach the traditional retirement age of 65 within

(Text continued on page 70)

Table 5.5: Quarterly Employment for Selected Licensed Health Care Occupations in Health Care & Social Assistance (NAICS[a] 62) by Urban and Rural Areas in Wyoming, 2010Q3 and 2015Q3

		Statewide				Rural				Urban			
				Change, 2010Q3-2015Q3				Change, 2010Q3-2015Q3				Change, 2010Q3-2015Q3	
SOC[b] Code	Title	2010 Q3	2015 Q3	N	%	2010 Q3	2015 Q3	N	%	2010 Q3	2015 Q3	N	%
193031	Clinical, Counseling, & School Psychologists	60	53	-7	-11.7	11	9	-2	-18.2	49	46	-3	-6.1
211011	Substance Abuse & Behavioral Disorder Counselors	39	54	15	38.5	7	9	2	28.6	34	45	11	32.4
211013	Marriage & Family Therapists	33	32	-1	-3.0	8	7	-1	-12.5	25	25	0	0.0
211019	Counselors, All Other	234	351	117	50.0	66	97	31	47.0	168	258	90	53.6
211029	Social Workers, All Other	207	282	75	36.2	51	56	5	9.8	156	226	70	44.9
291011	Chiropractors	65	77	12	18.5	20	20	0	0.0	45	57	12	26.7
291021	Dentists, General	175	209	34	19.4	47	55	8	17.0	130	157	27	20.8
291041	Optometrists	70	80	10	14.3	16	19	3	18.8	55	61	6	10.9
291051	Pharmacists	138	159	21	15.2	26	29	3	11.5	113	132	19	16.8
291061	Anesthesiologists	45	49	4	8.9	N/D	5	N/D	N/D	41	44	3	7.3
291062	Family & General Practitioners	186	197	11	5.9	83	88	5	6.0	104	113	9	8.7

[a]North American Industry Classification.
[b]Standard Occupational Classification
N/D = Not discloseable due to confidentiality.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
Prepared by M. Halama, Research & Planning, WY DWS, 4/4/17.

(Table continued on page 69)

(Table continued from page 68)

Table 5.5: Quarterly Employment for Selected Licensed Health Care Occupations in Health Care & Social Assistance (NAICS[a] 62) by Urban and Rural Areas in Wyoming, 2010Q3 and 2015Q3

		Statewide				Rural				Urban			
				Change, 2010Q3-2015Q3				Change, 2010Q3-2015Q3				Change, 2010Q3-2015Q3	
SOC[b] Code	Title	2010 Q3	2015 Q3	N	%	2010 Q3	2015 Q3	N	%	2010 Q3	2015 Q3	N	%
291063	Internists, General	113	139	26	23.0	17	16	-1	-5.9	97	124	27	27.8
291064	Obstetricians & Gynecologists	54	58	4	7.4	10	12	2	20.0	44	46	2	4.5
291065	Pediatricians, General	41	48	7	17.1	7	6	-1	-14.3	34	42	8	23.5
291066	Psychiatrists	29	31	2	6.9	N/D	N/D	N/D	N/D	25	27	2	8.0
291067	Surgeons	124	132	8	6.5	21	30	9	42.9	103	102	-1	-1.0
291069	Physicians & Surgeons, All Other	180	244	64	35.6	14	27	13	92.9	167	218	51	30.5
291071	Physician Assistants	N/D	194	N/D	N/D	N/D	50	N/D	N/D	N/D	147	N/D	N/D
291081	Podiatrists	12	13	1	8.3	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
291122	Occupational Therapists	236	276	40	16.9	51	62	11	21.6	186	217	31	16.7
291123	Physical Therapists	293	367	74	25.3	70	102	32	45.7	225	271	46	20.4
291126	Respiratory Therapists	213	230	17	8.0	46	54	8	17.4	173	183	10	5.8
291127	Speech-Language Pathologists	134	191	57	42.5	34	57	23	67.6	100	135	35	35.0
291141	Registered Nurses	4,153	4,796	643	15.5	962	1,024	62	6.4	3,253	3,838	585	18.0
291181	Audiologists	18	15	-3	-16.7	5	N/D	N/D	N/D	13	N/D	N/D	N/D
292021	Dental Hygienists	312	380	68	21.8	78	87	9	11.5	253	303	50	19.8
292034	Radiologic Technologists & Technicians	448	594	146	32.6	113	141	28	24.8	341	463	122	35.8
292052	Pharmacy Technicians	128	168	40	31.3	36	46	10	27.8	92	122	30	32.6
292061	Licensed Practical & Licensed Vocational Nurses	689	616	-73	-10.6	200	183	-17	-8.5	501	441	-60	-12.0
292092	Hearing Aid Specialists	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
311014	Nursing Assistants	3,325	3,177	-148	-4.5	945	922	-23	-2.4	2,433	2,285	-148	-6.1
312021	Physical Therapist Assistants	110	158	48	43.6	37	44	7	18.9	73	115	42	57.5
319091	Dental Assistants	302	362	60	19.9	72	90	18	25.0	231	277	46	19.9
394011	Embalmers	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
394031	Morticians, Undertakers, & Funeral Directors	N/D	5	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
	Total	**12,177**	**13,741**	**1,564**	**12.8**	**3,068**	**3,358**	**290**	**9.5**	**9,280**	**10,550**	**1,270**	**13.7**

[a]North American Industry Classification.
[b]Standard Occupational Classification
N/D = Not discloseable due to confidentiality.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
Prepared by M. Halama, Research & Planning, WY DWS, 4/4/17.

(Text continued from page 68)

the next 10 years, which could complicate Wyoming's health care delivery system.

Table 5.6 (see page 71) and Figure 5.3 (see page 72) show a distribution of licensed health care occupations in which individuals ages 55 and older made up at least 25% of total licensees in 2010Q3 and 2015Q3. In 2015Q3, for example, nearly half (47.1%) of all psychiatrists licensed and working in Wyoming were ages 55 and older. Other licensed health care occupations with a high percentage of individuals ages 55 and older included substance abuse & behavioral disorder counselors (44.0%), surgeons (39.1%), and pediatricians, general (38.8%). One in four individuals licensed and working in the occupations in Table 5.6 and Figure 5.3 will reach the traditional retirement age of 65 within the next 10 years.

As previously discussed in Chapter 2 and shown in Table 2.3 of this publication (see page 18), a greater proportion of adults ages 55 and older reside in smaller, rural counties. In many licensed health care occupations in Wyoming, the proportion of individuals ages 55 and older is quite different between rural and urban areas. As shown in Table 5.7 (see page 73), in rural areas in Wyoming, the licensed health care occupations with the greatest proportion of individuals ages 55 and older were physicians & surgeons, all (other 53.6%); surgeons (53.3%); and pediatricians, general (50.0%). By comparison, in urban areas in Wyoming, the licensed health care occupations with the greatest proportion of individuals ages 55 and older were substance abuse & behavioral disorder counselors (47.3%), marriage & family therapists (41.5%), and psychiatrists (40.0%).

Conclusions: Changes in Health Care Delivery

Wyoming's health care workforce has grown over the last five years. From 2010Q3 to 2015Q3, the total number of individuals working in licensed health care occupations in Wyoming increased from 15,725 to 17,558 (1,833, or 11.7%; see Table 5.2, page 64).

The structure of health care delivery in Wyoming has changed from 2010Q3 to 2015Q3. The percentage of those obtaining educational awards in Wyoming has grown since 2010, and more individuals are completing high school and obtaining postsecondary certificates and undergraduate or graduate degrees (Halama, in press). As noted in Chapter 1, Wyoming subsidizes undergraduate nursing and faculty advanced degree education through the Wyoming Investment in Nursing (WyIN) program. These factors may explain in part the increase in the number of registered nurses in Wyoming (643 individuals, or 15.5%) from 2010Q3 to 2015Q3, compared to the decline in licensed practical & vocational nurses (-73, or -10.6%) and CNAs (-148, or -4.5%; see Table 5.3, page 65).

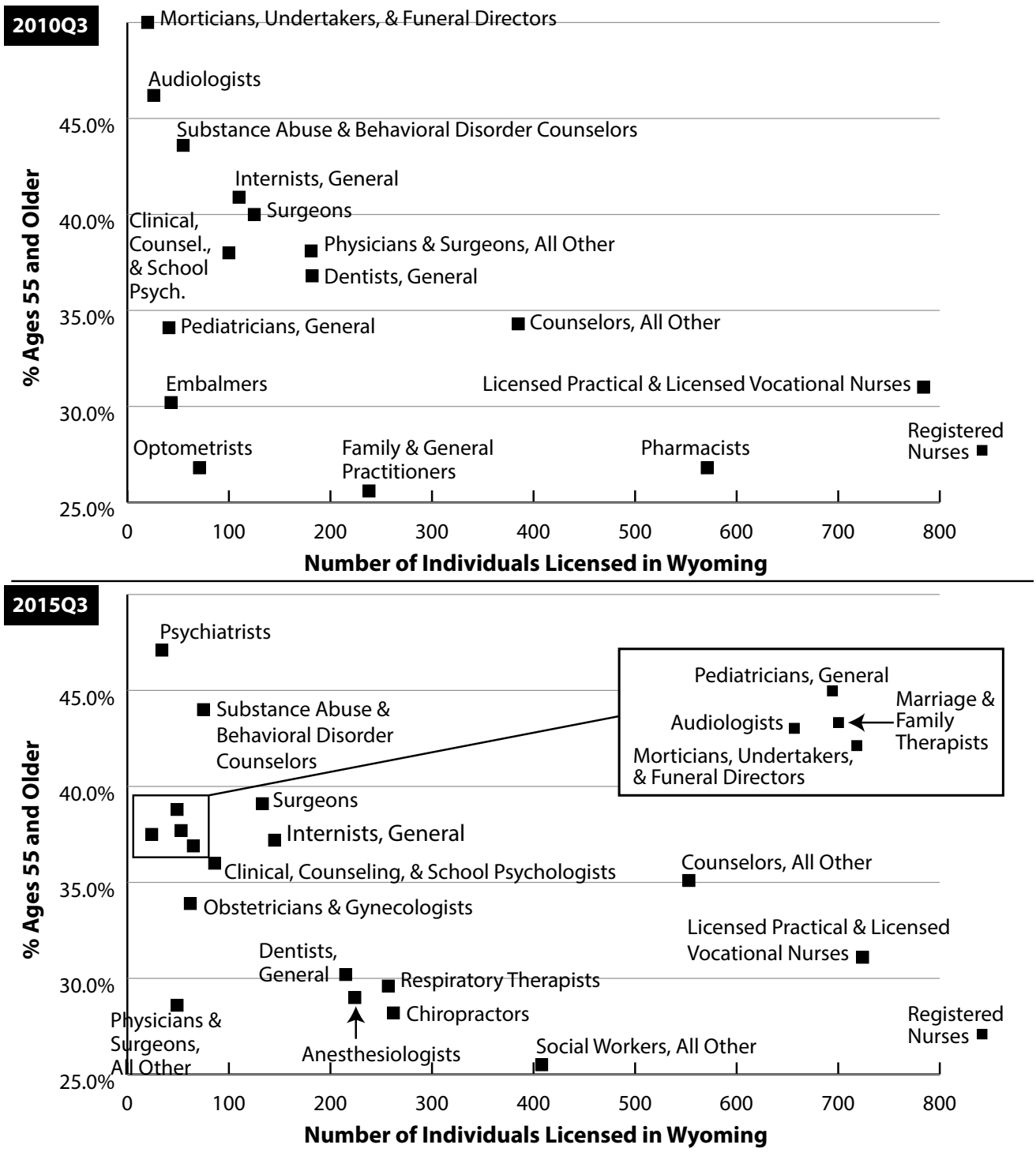
As mentioned in Chapter 2 of this publication, the number of primary care physicians has declined nationally, as more medical students choose to specialize in areas that lead to higher wages. This correlates to changes seen in Wyoming's health care delivery system from 2010Q3 to 2015Q3. For example, the number of family & general practitioners increased moderately (11 individuals, or 5.9%) while the number of physicans & surgeons, all other, increased

(Text continued on page 73)

Table 5.6: **Licensed Health Care Occupations in Which Individuals Ages 55 and Older Made up at Least 25% of Total Licensees Working in Wyoming, 2010Q3 and 2015Q3**

2010Q3			
Threshold	**Actual % 55+**	**SOC[a] Code**	**SOC Title**
	21.1		**Total, All Licensed Health Care Occupations**
25%			
	25.6	291062	Family & General Practitioners
	26.8	291041	Optometrists
	26.8	291051	Pharmacists
	27.0	291141	Registered Nurses
30%			
	30.2	394011	Embalmers
	31.0	292061	Licensed Practical & Licensed Vocational Nurses
	34.1	291065	Pediatricians, General
	34.3	211019	Counselors, All Other
35%			
	36.8	291021	Dentists, General
	38.0	193031	Clinical, Counseling, & School Psychologists
	38.1	291069	Physicians & Surgeons, All Other
40%			
	40.0	291067	Surgeons
	40.9	291063	Internists, General
	43.6	211011	Substance Abuse & Behavioral Disorder Counselors
45%			
	46.2	291181	Audiologists
	50.0	394031	Morticians, Undertakers, & Funeral Directors
2015Q3			
Threshold	**Actual % 55+**	**SOC[a] Code**	**SOC Title**
	21.5		**Total, All Licensed Health Care Occupations**
25%			
	25.5	211029	Social Workers, All Other
	25.6	291011	Chiropractors
	25.8	291141	Registered Nurses
	28.2	291069	Physicians & Surgeons, All Other
	28.6	291061	Anesthesiologists
	29.0	291062	Family & General Practitioners
	29.6	291126	Respiratory Therapists
30%			
	30.2	291021	Dentists, General
	31.1	292061	Licensed Practical & Licensed Vocational Nurses
	33.9	291064	Obstetricians & Gynecologists
35%			
	35.1	211019	Counselors, All Other
	36.0	193031	Clinical, Counseling, & School Psychologists
	36.9	394031	Morticians, Undertakers, & Funeral Directors
	37.2	291063	Internists, General
	37.5	291181	Audiologists
	37.7	211013	Marriage & Family Therapists
	38.8	291065	Pediatricians, General
	39.1	291067	Surgeons
40%			
	44.0	211011	Substance Abuse & Behavioral Disorder Counselors
45%			
	47.1	291066	Psychiatrists

[a]Standard Occupational Classification.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
Revised by M. Halama and M. Moore, Research & Planning, WY DWS, 4/6/17.



Source: Workforce Data Quality Initiative (WDQI) custom extract.
Prepared by M. Moore, Research & Planning, WY DWS, 3/24/17.
Excerpted from *Health Care Workforce Needs in Wyoming: Update 2017* (in press).

Figure 5.3: **Licensed Health Care Occupations in Which Individuals Ages 55 and Older Made up at Least 25% of the Total, 2010Q3 and 2015Q3**

(Text continued from page 70)

at a greater rate (64 individuals, or 35.6%; see Table 5.3, page 65).

Wages for licensed health care occupations tend to be higher in urban areas compared to rural areas. A shortage of certain health care occupations in rural

Table 5.7: Persons Working and Percent Age 55 and Older Working in Licensed Health Care Occupations in Health Care & Social Assistance (NAICS[a] 62) by Urban and Rural Area in Wyoming, 2010Q3 and 2015Q3

		Urban				Rural			
		2010Q3		2015Q3		2010Q3		2015Q3	
SOC[b] Code	SOC Title	N	% 55+	N	% 55+	N	% 55+	N	% 55+
193031	Clinical, Counseling, & School Psychologists	87	34.5	77	33.8	15	53.3	11	45.5
211011	Substance Abuse & Behavioral Disorder Counselors	42	42.9	55	47.3	15	40.0	20	35.0
211013	Marriage & Family Therapists	32	28.1	41	41.5	14	14.3	12	25.0
211019	Counselors, All Other	288	31.9	421	35.2	99	40.4	143	34.3
211029	Social Workers, All Other	224	18.3	328	23.8	72	19.4	81	32.1
291011	Chiropractors	47	14.9	62	24.2	22	22.7	22	27.3
291021	Dentists, General	137	38.7	163	30.7	49	32.7	55	27.3
291041	Optometrists	55	25.5	62	22.6	18	27.8	19	26.3
291051	Pharmacists	464	23.9	441	22.0	125	36.8	136	33.1
291061	Anesthesiologists	41	26.8	44	29.5	N/D	N/D	5	20.0
291062	Family & General Practitioners	152	23.0	138	26.8	94	28.7	92	32.6
291063	Internists, General	100	38.0	129	37.2	18	44.4	17	35.3
291064	Obstetricians & Gynecologists	46	28.3	50	32.0	10	50.0	12	41.7
291065	Pediatricians, General	35	40.0	43	37.2	7	0.0	6	50.0
291066	Psychiatrists	29	27.6	30	40.0	5	80.0	N/D	N/D
291067	Surgeons	105	37.1	103	35.0	22	50.0	30	53.3
291069	Physicians & Surgeons, All Other	171	38.0	235	25.5	14	28.6	28	53.6
291071	Physician Assistants	N/D	N/D	156	16.7	N/D	N/D	50	34.0
291081	Podiatrists	9	33.3	10	10.0	N/D	N/D	N/D	N/D
291122	Occupational Therapists	239	10.9	285	13.0	71	14.1	82	18.3
291123	Physical Therapists	235	15.3	288	19.4	77	19.5	105	20.0
291126	Respiratory Therapists	191	18.8	207	29.0	52	25.0	60	35.0
291127	Speech-Language Pathologists	156	18.6	218	20.6	54	20.4	97	21.6
291141	Registered Nurses	3,810	25.3	4,461	24.1	1,179	31.6	1,264	31.9
291181	Audiologists	21	42.9	21	33.3	5	60.0	N/D	N/D
292021	Dental Hygienists	270	14.8	337	18.1	81	16.0	91	25.3
292034	Radiologic Technologists & Technicians	372	10.2	488	13.5	121	24.8	153	26.1
292052	Pharmacy Technicians	475	10.1	554	11.4	172	19.2	199	15.1
292061	Licensed Practical & Licensed Vocational Nurses	565	28.3	526	28.3	240	36.7	208	37.0
292092	Hearing Aid Specialists	9	11.1	9	11.1	N/D	N/D	N/D	N/D
311014	Nursing Assistants	3,141	10.1	3,032	10.1	1,287	15.0	1,209	14.5
312021	Physical Therapist Assistants	74	8.1	123	14.6	39	0.0	50	8.0
319091	Dental Assistants	261	10.3	305	8.5	80	16.3	100	9.0
394011	Embalmers	34	32.4	N/D	N/D	10	20.0	N/D	N/D
394031	Morticians, Undertakers, & Funeral Directors	11	27.3	43	32.6	10	70.0	23	43.5
Total, All Licensed Health Care Occupations		**11,934**	**19.7**	**13,485**	**20.2**	**4,088**	**24.6**	**4,394**	**25.3**

[a]North American Industry Classification System.
[b]Standard Occupational Classification.
N/D = Not discloseable due to confidentiality.
Source: Workforce Data Quality Initiative custom extract.
Prepared by M. Halama and M. Moore, Research & Planning, WY DWS, 5/9/17.

areas may result in higher health care costs. In addition, a greater demand for services in urban areas may lead to more hours worked compared to rural areas. In other occupations where wages tend to be higher in rural areas than urban, such as pharmacists, individuals may be older and have more experience, which may lead to higher wages.

In addition, individuals working in urban areas tend to work more hours than those working in rural areas. With the varying populations of each county, individuals working in licensed health care occupations in urban areas may have the opportunity to work more hours because of the additional services offered to larger communities.

Some licensed health care occupations are predominantly held by females, such as dental assistants, CNAs, licensed practical & vocational nurses, and registered nurses. Other licensed health care occupations tend to be more male dominated, such as surgeons, physicians, and anesthesiologists.

A greater proportion of adults ages 55 and older reside in smaller, rural counties compared to larger, urban counties. Consequently, a greater proportion of individuals ages 55 and older work in some licensed health care occupations in rural areas. Rural areas will need to address the potential labor shortages as older workers reach the traditional retirement age of 65 and leave selected occupations.

References

Halama, M. (In press). Beveridge curve analysis of Wyoming.

Helmer, G. (2008, April). Micropolitan Statistical Areas: a few highlights. Retrieved March 22, 2017, from https://www.bls.gov/opub/mlr/2008/04/art4full.pdf

Ratcliffe, M., Burd, C., Holder, K., & Fields, A. (2016, December). Defining rural at the U.S. Census Bureau. Retrieved March 22, 2017, from http://www2.census.gov/geo/pdfs/reference/ua/Defining_Rural.pdf

State of Wyoming. (2016, October 2016). WIOA State Plan for the State of Wyoming. Retrieved April 10, 2017, from http://wyowdc.wyo.gov/unified-state-plan-1

Chapter 6: State and Local Health Care Shortages

by: Tony Glover, Workforce Information Supervisor

This chapter examines the current health care workforce in Wyoming and sub-state regions and compares it to a national occupational staffing pattern. The estimates presented in this section are correspondingly conservative. The information in this chapter is presented in terms of jobs worked.

In This Chapter

The Occupational Employment Statistics (OES) program collects occupational employment and wage data on jobs worked by industry and place of work. Data are collected from employers in all 50 states, the District of Columbia, Guam, Puerto Rico, and the Virgin Islands, and are comparable across areas and nationally. This analysis combines national data on employment in health care-related occupations with data from Wyoming, Wyoming's sub-state regions and metropolitan statistical areas (MSA), and six border state MSAs identified in Table 6.1. Employment data are combined with census population counts from the U.S. Census Bureau (see Table 6.1). Wyoming's MSAs and substate regions are shown in Figure 6.1 (see page 76), while selected MSAs for surrounding states are shown in Figure 6.2.

Table 6.1: **Population Estimates for Metropolitan Statistical Areas (MSAs) and Substate Regions for Wyoming, Selected Surrounding States, and the U.S., 2010 and 2015**

Area	2010	2015
Colorado	5,048,254	5,456,574
Denver-Aurora-Lakewood MSA	2,554,468	2,814,330
Fort Collins MSA	300,524	333,577
Greeley MSA	254,166	285,174
Montana	990,643	1,032,949
Billings MSA	159,355	168,283
South Dakota	816,299	858,469
Rapid City MSA	135,064	144,134
Utah	2,775,426	2,995,919
Salt Lake City MSA	1,091,699	1,170,266
Wyoming	564,516	586,107
Casper MSA	75,472	82,178
Cheyenne MSA	92,271	97,121
Central-Southeast Region	90,669	92,488
Northeast Region	98,266	102,492
Northwest Region	93,511	94,634
Southwest Region	114,327	117,194
U.S. Total	309,346,863	321,418,820

Source: U.S. Census Bureau.
Prepared by T. Glover, Research & Planning, WY DWS, 4/10/17.

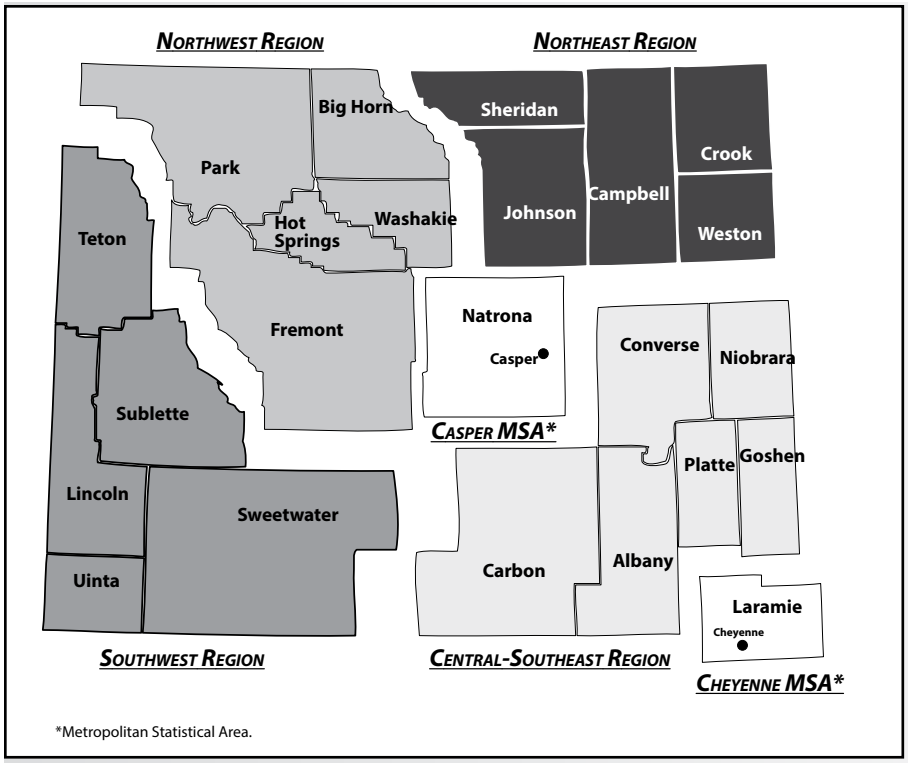


Figure 6.1: Metropolitan Statistical Areas (MSAs) and Sub-State Regions for Wyoming

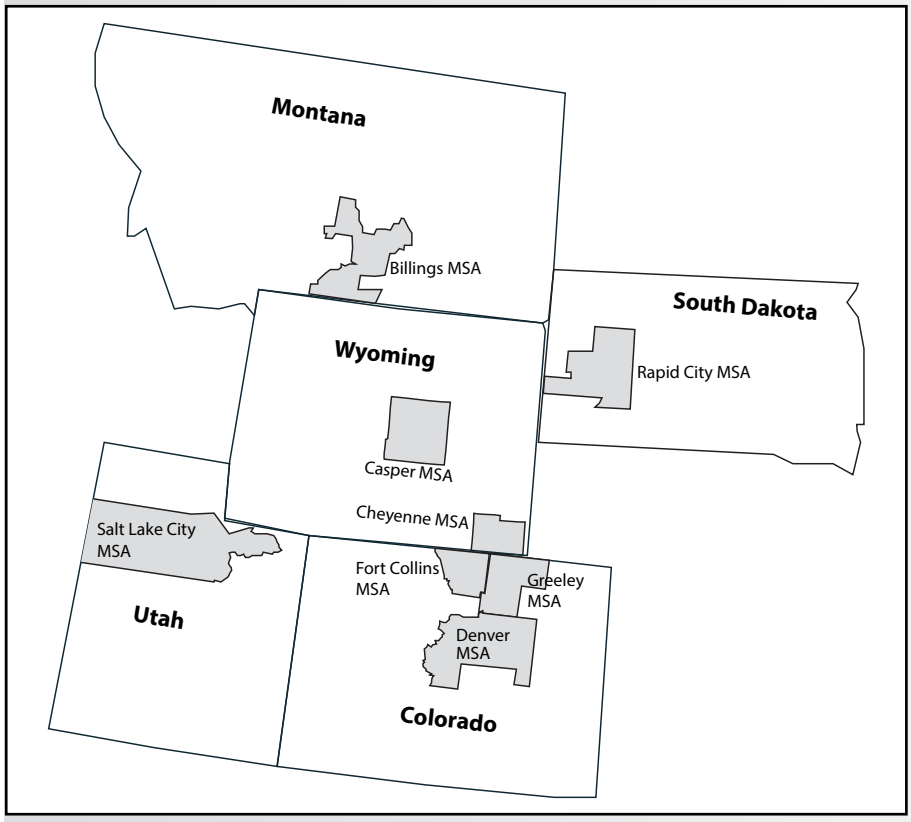


Figure 6.2: Selected Metropolitan Statistical Areas (MSAs) for Wyoming and Surrounding States

Health care-related occupations in this analysis were selected based on the description in the Patient Protection and Affordable Care Act in Section 5101 i (1) and include "all health care providers with direct patient care and support responsibilities such as physicians, nurses, nurse practitioners… ." The OES program collects data on occupations by a Standard Occupational Classification (SOC) code; a complete list of SOCs and occupational titles are in the first two left hand columns of Table 6.2 (see pages 77-79) and are listed in numerical SOC code order.

In Table 6.2, the column titled "U.S. Employment" is the total employment for the specific occupation in the U.S. in 2015. The column titled "U.S. Rate per 10,000" is calculated by dividing the U.S. total employment by the U.S. population from Table 6.1 and multiplying it by 10,000. The result is the employment per 10,000 persons. For example, referring to registered nurses (RNs) (SOC 29-1111; see Table 6.2, page 78), in 2015 there were 91.1 RNs per 10,000 individuals in the population in the U.S. This analysis assumes that the minimum number of RNs needed to meet the

U.S. standard is 91.1 per 10,000 people. Therefore, a city with a population of 5,000 people should have 46 RNs and a city of 20,000 should have 182 RNs.

In Table 6.2, the data for Wyoming, Wyoming's sub-state regions and MSAs, and border state MSAs are presented as the number of jobs by occupation needed or in excess relative to the national rate per 10,000. In many instances, employment estimates were not available at the sub-state regional level due to confidentiality. Occupational Employment Statistics (OES) data, which were used to prepare Table 6.2, are collected under a pledge of employer and worker confidentiality. Estimates are suppressed in instances where the identity of either the employer or the worker is at risk.

Positive numbers in Table 6.2 indicate a shortage, or how many more jobs that particular MSA or region needs in order to meet the U.S. rate per 10,000. Negative numbers indicate a surplus of jobs in a given occupation. For example, in the first row of data in Table 6.2, the U.S. employment of clinical, counseling, and school psychologists (SOC 19-3031) was 105,600 and the rate per 10,000 people of the population was 3.3. Using the

(Text continued on page 80)

Table 6.2: **Selected Health Care Workforce Occupations by Wyoming Area and Need Relative to National Staffing Standard, 2015**

		U.S.		Wyoming Regions							Surrounding State MSAs[a]	
SOC[b] Code	SOC Title	Employment	Rate/ 10,000 Population	Total	Cheyenne MSA	Casper MSA	Central-SE	NE	NW	SW	Denver-Aurora-Lakewood, CO	Salt Lake City, UT
19-3031	Clinical, Counseling, & School Psych.	105,600	3.3	-52.7	-33.0	0.0	-18.5	-5.1	3.8	-1.2	-562.9	-198.9
21-1011	Substance Abuse & Behavioral Disorder Counselors	87,090	2.7	-35.2	4.9	-18.1	-8.3	8.2	-24.6	4.7	168.9	70.2
21-1013	Marriage & Family Therapists	32,070	1.0	41.0	0.0	3.3	3.7	8.2	7.6	9.4	-56.3	70.2
21-1014	Mental Health Counselors	128,200	4.0	-93.8	-51.5	2.5	-21.3	1.0	-38.8	16.4	-1519.7	58.5
21-1015	Rehabilitation Counselors	101,630	3.2	17.6	-6.8	-41.9	17.6	29.7	-0.9	23.4	168.9	152.1
21-1021	Child, Family, & School Social Workers	294,080	9.1	-193.4	-33.0	-52.6	-10.2	7.2	-44.5	-57.4	-731.7	339.4
21-1022	Healthcare Social Workers	155,590	4.8	128.9	26.2	19.7	29.6	31.8	-18.0	36.3	225.1	-81.9
21-1023	Mental Health & Substance Abuse Social Workers	110,070	3.4	76.2	21.4	-13.1	20.3	-9.2	15.1	0.0	-84.4	-46.8
21-1029	Social Workers, All Other	59,570	1.9	-58.6	-19.4	6.6	-34.2	-17.4	0.0	7.0	56.3	-46.8
21-1099	Community & Social Service Specialists, All Other	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29-1011	Chiropractors	32,080	1.0	-23.4	-6.8	3.3	2.8	-2.0	-9.5	-8.2	-365.9	-23.4

[a]Metropolitan Statistical Area.

[b]Standard Occupational Classification.

Negative numbers indicate surplus. Positive numbers indicate a need.

Source: Occupational Employment Statistics.

Prepared by T. Glover, Research & Planning, WY DWS, 4/10/17.

(Table continued on page 78)

(Table continued from page 77)

Table 6.2: **Selected Health Care Workforce Occupations by Wyoming Area and Need Relative to National Staffing Standard, 2015**

		U.S.		Wyoming Regions							Surrounding State MSAs[a]	
SOC[b] Code	SOC Title	Employ-ment	Rate/ 10,000 Population	Total	Cheyenne MSA	Casper MSA	Central-SE	NE	NW	SW	Denver-Aurora-Lakewood, CO	Salt Lake City, UT
29-1022	Oral & Maxillofacial Surgeons	5,000	0.2	0.0		0.0	0.0	0.0		0.0		
29-1023	Prosthodontists	6,120	0.2	0.0		0.0		0.0	0.0	0.0		
29-1029	Dentists, general	105,630	3.3	-64.5	-23.3	-24.7	5.5	-8.2	-18.0	5.9	-28.1	35.1
29-1031	Dietitians & Nutritionists	59,740	1.9	29.3	1.9	2.5	10.2	8.2	-3.8	9.4	28.1	-81.9
29-1041	Optometrists	35,300	1.1	-11.7	-1.0	-4.1	3.7	-5.1	-7.6	0.0	-140.7	-46.8
29-1051	Pharmacists	295,620	9.2	-5.9	-19.4	-4.1	-15.7	7.2	8.5	16.4	-1,069.4	-292.6
29-1061	Anesthesiologists	29,220	0.9	5.9	7.8	-4.9	0.9	-10.2	0.0	3.5	0.0	0.0
29-1062	Family & General Practitioners	127,430	4.0	-23.4	8.7	-13.1	-20.3	13.3	-28.4	14.1	-140.7	-397.9
29-1063	Internists, General	48,920	1.5	35.2	-2.9	9.9	3.7	10.2	11.4	3.5	225.1	-70.2
29-1064	Obstetricians & Gynecologists	20,090	0.6	-11.7	-3.9	-0.8	-2.8	-8.2	-3.8	4.7	-56.3	0.0
29-1065	Pediatricians, General	28,660	0.9	0.0	5.8	-11.5	0.9	-2.0	5.7	1.2	0.0	-58.5
29-1066	Psychiatrists	24,060	0.7	0.0	-2.9	0.8	-0.9	5.1	4.7	-4.7	-56.3	-58.5
29-1067	Surgeons	41,600	1.3	-35.2	-2.9	-5.8	-3.7	-20.5	2.8	-5.9	-253.3	0.0
29-1069	Physicians & Surgeons, All Other	322,740	10.0	228.6	-65.1	19.7	79.5	62.5	26.5	104.3	1,435.3	0.0
29-1071	Physician Assistants	98,470	3.1	-70.3	-8.7	-33.7	2.8	-8.2	-11.4	-8.2	-450.3	-163.8
29-1081	Podiatrists	9,500	0.3	5.9	1.0	0.0	0.0	0.0	0.9	1.2	0.0	0.0
29-1111	Registered Nurses	2,928,810	91.1	152.4	-150.5	-231.7	214.6	-36.9	57.7	303.5	-1,547.9	-725.6
29-1122	Occupational Therapists	114,660	3.6	-58.6	-17.5	-27.9	4.6	0.0	-12.3	-8.2	-450.3	46.8
29-1123	Physical Therapists	209,690	6.5	-5.9	4.9	12.3	7.4	-21.5	-17.0	8.2	-422.1	-11.7
29-1124	Radiation Therapists	16,930	0.5	5.9	0.0	-1.6	2.8	-1.0	1.9	4.7	0.0	-11.7
29-1125	Recreational Therapists	17,880	0.6	-5.9	3.9	4.1	-4.6	-1.0	-9.5	0.0	84.4	-35.1
29-1126	Respiratory Therapists	120,330	3.7	-5.9	-1.9	-27.1	9.2	6.1	0.9	8.2	28.1	-11.7
29-1127	Speech-Language Pathologists	131,450	4.1	-82.1	-20.4	-14.8	1.8	-6.1	-28.4	-11.7	-478.4	81.9
29-1181	Audiologists	12,070	0.4	5.9	1.9	0.8	2.8	-7.2	2.8	2.3	-28.1	-58.5
29-1199	Health Diagnosing & Treating Prac., All Other	35,750	1.1	23.4	-3.9	7.4	0.0	4.1	8.5	-2.3	-140.7	23.4
29-2011	Medical & Clinical Laboratory Technologists	162,950	5.1	23.4	-19.4	12.3	-2.8	15.4	0.0	19.9	-168.9	-1182.0
29-2012	Medical & Clinical Laboratory Tech.	157,610	4.9	152.4	6.8	-0.8	34.2	22.5	36.9	52.7	56.3	-1006.4
29-2021	Dental Hygienists	200,550	6.2	-146.5	-39.8	-39.4	12.9	-32.8	-19.9	-29.3	-1,097.6	-304.3
29-2031	Cardiovascular Technologists & Technicians	51,400	1.6	58.6	-7.8	4.1	0.0	0.0	13.2	0.0	112.6	46.8
29-2032	Diagnostic Medical Sonographers	61,250	1.9	46.9	4.9	8.2	10.2	13.3	0.0	9.4	28.1	-46.8

[a]Metropolitan Statistical Area.

[b]Standard Occupational Classification.

Negative numbers indicate surplus. Positive numbers indicate a need.

Source: Occupational Employment Statistics.

Prepared by T. Glover, Research & Planning, WY DWS, 4/10/17.

(Table continued on page 79)

(Table continued from page 78)

Table 6.2: **Selected Health Care Workforce Occupations by Wyoming Area and Need Relative to National Staffing Standard, 2015**

		U.S.		Wyoming Regions							Surrounding State MSAs[a]	
SOC[b] Code	SOC Title	Employment	Rate/ 10,000 Population	Total	Cheyenne MSA	Casper MSA	Central-SE	NE	NW	SW	Denver-Aurora-Lakewood, CO	Salt Lake City, UT
29-2033	Nuclear Medicine Technologists	19,740	0.6	-23.4	-35.9	0.8	-0.9	4.1	4.7	2.3	0.0	0.0
29-2034	Radiologic Technologists & Technicians	229,050	7.1	11.7	-12.6	-12.3	4.6	9.2	11.4	14.1	-84.4	11.7
29-2041	Emergency Medical Tech. & Paramedics	236,890	7.4	-234.4	41.8	-10.7	-78.6	-10.2	-55.8	-118.4	225.1	-362.8
29-2051	Dietetic Tech.	28,950	0.9	46.9	6.8	6.6	0.0	0.0	6.6	0.0	28.1	-140.4
29-2052	Pharmacy Tech.	379,430	11.8	128.9	-21.4	21.4	22.2	30.7	31.2	48.0	394.0	-526.6
29-2053	Psychiatric Tech.	58,450	1.8	58.6	7.8	-18.1	11.1	0.0	0.0	0.0	0.0	-70.2
29-2054	Respiratory Therapy Technicians	10,000	0.3	5.9	0.0	0.0	0.0	0.0	-0.9	1.2		0.0
29-2055	Surgical Tech.	100,270	3.1	29.3	-1.9	-10.7	20.3	1.0	9.5	10.5	84.4	-269.2
29-2061	Licensed Practical & Licensed Vocational Nurses	697,250	21.7	504.1	60.2	18.1	117.5	51.2	92.7	162.9	3,630.5	1743.7
29-2071	Medical Records & Health Information Technicians	189,930	5.9	5.9	-31.1	-16.4	3.7	18.4	8.5	24.6	422.1	-234.1
29-2081	Opticians, Dispensing	73,520	2.3	-76.2	-25.3	-61.6	5.5	-6.1	-4.7	14.1	84.4	-11.7
29-2091	Orthotists & Prosthetists	7,100	0.2	5.9	0.0	0.0		0.0			28.1	-46.8
29-2099	Health Technologists & Technicians, All Other	149,100	4.6	134.8	-31.1	23.0	26.8	31.8	36.0	48.0	-731.7	117.0
31-1011	Home Health Aides	820,630	25.5	844.0	206.9	181.6	178.5	148.6	-44.5	171.1	-1,210.2	1732.0
31-1012	Nursing Assistants (CNAs)	1,473,230	45.8	-726.8	-122.4	-198.9	16.6	-87.1	-172.2	-161.7	3,095.8	854.3
31-1013	Psychiatric Aides	69,550	2.2	-41.0	0.0	-22.2	14.8	-97.4	15.1	24.6	478.4	0.0
31-2011	Occupational Therapy Assistants	35,460	1.1	-23.4	-2.9	-24.7	-2.8	3.1	-2.8	4.7	0.0	81.9
31-2012	Occupational Therapy Aides	7,570	0.2	-5.9	0.0	0.0	-9.2		0.9	-3.5		-58.5
31-2021	Physical Therapist Assistants	81,230	2.5	-11.7	-7.8	-4.1	0.0	-4.1	-15.1	18.8	225.1	105.3
31-2022	Physical Therapist Aides	50,540	1.6	-64.5	1.0	-5.8	-4.6	-27.7	-10.4	-15.2	337.7	-58.5
31-9011	Massage Therapists	92,090	2.9	76.2	8.7	21.4	23.1	17.4	21.8	-17.6	-2,476.6	-304.3
31-9091	Dental Assistants	323,110	10.1	35.2	10.7	-8.2	15.7	28.7	33.1	-46.9	-28.1	-877.7
31-9092	Medical Assistants	601,240	18.7	416.1	46.6	14.0	71.2	137.3	79.5	65.6	534.7	-1064.9
31-9093	Medical Equipment Preparers	50,330	1.6	23.4	8.7	-15.6	9.2	11.3	7.6	1.2	-140.7	-70.2
31-9094	Medical Transcriptionists	57,830	1.8	-11.7	-22.3	-12.3	5.5	-1.0	5.7	10.5	-84.4	0.0
31-9095	Pharmacy Aides	38,040	1.2	17.6	7.8	0.0	0.0	-10.2	8.5	0.0	253.3	35.1
31-9099	Healthcare Support Workers, All Other	213,450	6.6	-105.5	-79.6	-88.8	26.8	21.5	2.8	10.5	-112.6	-222.4
39-9021	Personal Care Aides	1,369,230	42.6	744.4	49.5	-27.9	150.8	233.7	142.0	199.2	731.7	2340.5

[a]Metropolitan Statistical Area.

[b]Standard Occupational Classification.

Negative numbers indicate surplus. Positive numbers indicate a need.

Source: Occupational Employment Statistics.

Prepared by T. Glover, Research & Planning, WY DWS, 4/10/17.

(Text continued from page 77)

assumption that the appropriate number of school psychologists is 3.3 per 10,000 persons in the population, it appears that Wyoming is overstaffed by 52.7 clinical, counseling, and school psychologists, while Wyoming's northwest region needs 3.8 more.

The next occupation in Table 6.2 (see page 77) is substance abuse & behavioral disorder counselors (SOC 21-1011), with total employment in the U.S. of 87,090 or 2.7 per 10,000 population, and Wyoming is overstaffed by 35.2. Table 6.2 shows that Wyoming is overstaffed by 247 for family and general practitioners (SOC 29-1062), but understaffed by 277 for all other physicians and surgeons (SOC 29-1069).

The map in Figure 6.1 (see page 76) shows the six sub-state regions of Wyoming used by the OES program for sampling and estimation purposes. The geographical allocation of occupations to sub-state regions introduces additional problems in determining the number of health care workers needed or in excess relative to the national rate per 10,000. For example, 214.6 RNs (SOC 29-1111) are needed in Wyoming's central-southeast region per 10,000 people, according to Table 6.2, while the Cheyenne and Casper MSAs show registered nurse excesses of 150.5 and 231.7, respectively. Other research conducted by R&P (Glover, in press) related to commuting patterns demonstrates that persons living in Fremont, Johnson, and Converse counties often commute to Natrona County – which includes Casper, Wyoming's second largest city – for employment. It is possible that persons in these counties seek health care in Natrona County as well. The same scenario is relevant for the southeast corner of the state, with persons from Albany, Platte, and Goshen counties commuting to Laramie County, which includes Cheyenne, Wyoming's largest city. The apparent excess of occupations such as RNs in these larger cities may indicate that MSAs like Cheyenne and Casper need more licensed health care professionals because they are regional destinations for health care consumers.

Table 6.2 identifies jobs by occupation that are needed or in excess relative to the national rate per 10,000. By comparison, Table 6.3 (see page 81) includes employment estimates (number of jobs worked) and rate per 10,000 for selected health care occupations at the MSA and sub-state regional levels. The occupations presented in Table 6.3 were chosen because statewide employment was at least 300 and there were relatively few confidentiality issues at the sub-state region level.

As previously noted, employment (the number of jobs worked) is not presented in Table 6.2 at the MSA or sub-state region level due to confidentiality. However, Table 6.3 provides employment estimates and the rate per 10,000 for some selected licensed health care occupations at the MSA and sub-state region level for comparison purposes. For example, as shown in Table 6.3, the national average rate of registered nurses per 10,000 individuals in the population was 91.1 in 2015. That rate was considerably higher in the Casper (119.3) and Cheyenne (106.6) MSAs and considerably lower in the southwest (65.2) and central southeast (67.9) regions of the state. This is consistent with the information presented in Chapter 5 of this publication, which shows that registered

(Text continued on page 82)

Table 6.3: **Estimated Employment and Rate per 10,000 Individuals in the Population for Selected Health Care Workforce Occupations by Area, 2015**

				Wyoming MSAs[a] and Sub-State Regions							Surrounding States MSAs	
SOC[b] Code	SOC Title	N and Rate	U.S. (Pop. = 321,418,820)	WY (Pop. = 586,107)	Casper MSA (Pop. = 82,178)	Cheyenne MSA (Pop. = 97,121)	Central-SE (Pop. = 92,488)	NE (Pop. = 102,492)	NW (Pop. = 94,634)	SW (Pop. = 117,194)	Denver MSA[c] (Pop. = 2,814,330)	Salt Lake MSA (Pop. = 1,170,266)
21-1014	Mental Health Counselors	N	128,200	327	N/D	91	59	40	76	N/D	2,650	410
		Rate	4.0	5.6	N/D	9.3	6.3	3.9	8.1	N/D	9.4	3.5
21-1021	Child, Family, & School Social Workers	N	294,080	725	128	121	94	86	131	164	3,280	730
		Rate	9.1	12.4	15.5	12.5	10.2	8.4	13.8	14.0	11.7	6.2
29-1051	Pharmacists	N	295,620	546	79	108	101	87	79	92	3,650	1,370
		Rate	9.2	9.3	9.7	11.2	10.9	8.5	8.3	7.8	13.0	11.7
29-1069	Physicians & Surgeons, All Other	N	322,740	358	63	162	N/D	40	68	13	1,380	N/D
		Rate	10.0	6.1	7.6	16.7	N/D	3.9	7.2	1.1	4.9	N/D
29-1111	Registered Nurses	N	2,928,810	5,184	981	1,035	628	971	804	765	27,190	11,390
		Rate	91.1	88.5	119.3	106.6	67.9	94.7	85.0	65.2	96.6	97.3
29-1123	Physical Therapists	N	209,690	388	41	58	53	88	79	68	2,260	770
		Rate	6.5	6.6	5.0	6.0	5.7	8.6	8.3	5.8	8.0	6.6
29-1127	Speech-Language Pathologists	N	131,450	320	48	60	36	48	67	60	1,640	400
		Rate	4.1	5.5	5.9	6.2	3.9	4.7	7.1	5.1	5.8	3.4
29-2021	Dental Hygienists	N	200,550	511	91	100	44	96	78	102	2,850	1,030
		Rate	6.2	8.7	11.0	10.3	4.8	9.4	8.3	8.7	10.1	8.8
29-2034	Radiologic Technologists & Technicians	N	229,050	403	71	82	61	64	56	70	2,080	820
		Rate	7.1	6.9	8.6	8.4	6.6	6.2	5.9	5.9	7.4	7.0
29-2041	Emergency Medical Tech. & Paramedics	N	236,890	666	71	30	147	86	126	205	1,860	1,230
		Rate	7.4	11.4	8.7	3.1	15.9	8.4	13.3	17.5	6.6	10.5
29-2052	Pharmacy Technicians	N	379,430	560	76	136	87	91	80	90	2,930	1,910
		Rate	11.8	9.6	9.2	14.0	9.4	8.8	8.5	7.7	10.4	16.3
29-2061	Licensed Practical & Licensed Vocational Nurses	N	697,250	769	160	150	83	171	113	92	2,490	790
		Rate	21.7	13.1	19.5	15.5	9.0	16.7	11.9	7.8	8.8	6.8
29-2071	Medical Records & Health Info. Techs.	N	189,930	338	65	88	51	42	48	45	1,250	920
		Rate	5.9	5.8	7.9	9.1	5.5	4.1	5.0	3.8	4.4	7.9
31-1011	Home Health Aides	N	820,630	652	N/D	41	N/D	113	286	128	8,390	1,250
		Rate	25.5	11.1	N/D	4.2	N/D	11.0	30.2	10.9	29.8	10.7
31-1012	Nursing Assistants	N	1,473,230	3,410	575	567	407	557	606	698	9,800	4,500
		Rate	45.8	58.2	70.0	58.4	44.0	54.3	64.0	59.6	34.8	38.5
31-9091	Dental Assistants	N	323,110	559	91	88	78	75	62	166	2,870	2,060
		Rate	10.1	9.5	11.1	9.0	8.4	7.3	6.6	14.1	10.2	17.6
31-9092	Medical Assistants	N	601,240	681	140	135	102	54	98	153	4,730	3,250
		Rate	18.7	11.6	17.0	13.9	11.0	5.3	10.3	13.1	16.8	27.8
31-9099	Healthcare Support Workers, All Other	N	213,450	493	143	144	34	46	60	67	1,970	990
		Rate	6.6	8.4	17.4	14.8	3.7	4.5	6.3	5.7	7.0	8.5
39-9021	Personal Care Aides	N	1,369,230	1,751	378	364	N/D	N/D	261	300	11,270	2,640
		Rate	42.6	29.9	46.0	37.5	N/D	N/D	27.6	25.6	40.0	22.6

[a]Metropolitan Statistical Area.
[b]Standard Occupational Classification.
[c]Denver MSA includes Denver, Aurora, and Lakewood.
N/D = Not discloseable due to confidentiality.
Source: Occupational Employment Statistics.
Prepared by T. Glover and M. Moore, Research & Planning, WY DWS, 5/17/17.

(Text continued from page 80)

nurses made up a greater proportion of all licensed health care occupations in urban areas than in rural areas. As previously discussed in this chapter, the Casper and Cheyenne MSAs may have more licensed health care occupations per 10,000 people in the population because larger urban areas tend to be regional destinations for health care.

In conclusion, the current analysis is based on OES staffing pattern data collected at the state and national level and is therefore subject to sampling and nonsampling error. Consequently, estimation error could be expected to produce variability over time independent of change in real need. Given this limitation, it is important to focus on repeated measures (the same study done each year) and to address dramatic changes that may be a result of the aforementioned sampling error as they arise.

Advantages of the current analysis are that it is comprehensive (all occupations), inexpensive to compile, current, and readily adaptable to other norms and standards. This research proposed that the desired state of affairs for staffing ratios of health care occupations to the population is the distribution that occurs nationally. As research expands into the areas of access to care and desired staffing to population ratios for health care professionals, the current analysis could quickly be adapted to new standards at little to no cost.

The research presented in this section is exploratory in nature and future iterations will address the issues discussed in this section. In future research, it will be possible to look at access to health care professionals by the distance between health care seekers and health care services. The removal of nominal boundaries may provide a clearer understanding of what is available and where efforts should be focused to address Wyoming's growing health care needs.

Chapter 7: Wyoming Workers' Compensation Incidence Rates by Industry and Licensed Occupations

by: Patrick Manning, Principal Economist

In this chapter, R&P analyzes the incidence rates of injury at the major industrial sector, and also for licensed health care occupations within these industries.

In This Chapter

Reducing workplace injuries provides benefits to both employers and employees. For employers, the reduction in workplace injuries prevents a loss of productivity and leads to lower workers' compensation insurance rates. Employees can avoid serious injuries and loss of income. In extreme instances, an injury may prevent workers from returning to work. Additionally, reducing workplace injuries provides stability to the overall labor market.

Four states rely entirely on state-run programs for workers' compensation: Ohio, North Dakota, Washington, and Wyoming; this is referred to as a monopolistic state fund (Bonner, 2016). Many other states maintain state-run funds but also allow private insurance companies to insure employers and their employees.

Because Wyoming has a monopolistic workers' compensation state fund, research can be conducted on the entirety of the workers' compensation claims.

It is important to understand the differences between occupations and industries. An industry refers to the type of firm for which a person works, as defined by the North American Industry Classification System (NAICS). In contrast, an occupation refers to a specific task or set of tasks performed by an individual, as defined by the Standard Occupational Classification (SOC) System. One occupation may be found in several different industries. For example, as shown in Table 7.1 (see pages 84-85), registered nurses (SOC 29-1141) can work in retail trade (NAICS 44-45), educational services (NAICS 61), health care & social assistance (NAICS 62), and public administration (NAICS 92).

The objective of the research presented in this chapter is to determine workplace injury incidence rates by industry and licensed health care occupations.

Three sources of information were necessary to conduct this research: a complete workers' compensation database, a database of licensed health care occupations, and a complete database of wage records. The wage records database also contains the industry in which a person

(Text continued on page 86)

Table 7.1: **Injury Incident Rates of Individuals Working in Licensed Health Care Occupations by Selected Industry in Wyoming, 2010-2015**

Industry and NAICS[a] Code	SOC[b] Code	SOC Title	Workers' Compensation Claims	Quarters of Exposure Risk	Quarterly Incidence Rate %
Retail Trade (44,45)		Total, All Occupations in Retail Trade	6,643	895,207	0.7
	211029	All Other Social Workers	N/D	N/D	N/D
	291051	Pharmacists	14	9,284	0.2
	291141	Registered Nurses	N/D	N/D	N/D
	292034	Radiologic Technologists & Technicians	N/D	N/D	N/D
	292052	Pharmacy Technicians	29	12,501	0.2
	292061	Licensed Practical & Licensed Vocational Nurses	N/D	N/D	N/D
	311014	Nursing Assistants (CNAs)	33	5,327	0.6
	319091	Dental Assistants	5	524	1.0
		Licensed Occupation Subtotal[c]	89	29,132	0.3
Educational Services (61)		Total, All Occupations in Educational Services	4,721	791,998	0.6
	211019	All Other Counselors	N/D	N/D	N/D
	291051	Pharmacists	N/D	N/D	N/D
	291062	Family & General Practitioners	9	859	1.0
	291069	All Other Physicians & Surgeons	5	333	1.5
	291071	Physician Assistants	N/D	N/D	N/D
	291122	Occupational Therapists	9	1,704	0.5
	291123	Physical Therapists	N/D	N/D	N/D
	291127	Speech-Language Pathologists	N/D	N/D	N/D
	291141	Registered Nurses	30	10,511	0.3
	292021	Dental Hygienists	N/D	N/D	N/D
	292052	Pharmacy Technicians	N/D	N/D	N/D
	292061	Licensed Practical & Licensed Vocational Nurses	5	531	0.9
	311014	Nursing Assistants (CNAs)	19	3,060	0.6
		Licensed Occupation Subtotal[c]	91	26,393	0.3
Health Care & Social Assistance (62)		Total, All Occupations in Health Services	11,350	829,988	1.4
	193031	Clinical, Counseling, & School Psychologists	6	1,414	0.4
	211011	Substance Abuse & Behavioral Disorder Counselors	7	1,278	0.5
	211013	Marriage & Family Therapists	N/D	N/D	0.3
	211019	All Other Counselors	39	7,289	0.5
	211029	All Other Social Workers	43	6,233	0.7
	291011	Chiropractors	N/D	N/D	N/D
	291021	Dentists, General	6	4,693	0.1
	291051	Pharmacists	12	3,602	0.3
	291061	Anesthesiologists	5	1,124	0.4
	291062	Family & General Practitioners	18	4,603	0.4
	291063	Internists, General	11	3,240	0.3
	291064	Obstetricians & Gynecologists	10	1,293	0.8

[a]North American Industry Classification System.
[b]Standard Occupational Classification.
[c]Licensed occupations that incurred one or more workers' compensation claims.
N/D = Not discloseable due to confidentiality.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
Prepared by P. Manning, Research & Planning, WY DWS, 3/27/17.

(Table continued on page 85)

(Table continued from page 84)

Table 7.1: Injury Incident Rates of Individuals Working in Licensed Health Care Occupations by Selected Industry in Wyoming, 2010-2015

Industry and NAICS[a] Code	SOC[b] Code	SOC Title	Workers' Compensation Claims	Quarters of Exposure Risk	Quarterly Incidence Rate %
Health Care & Social Assistance (62)	291066	Psychiatrists	N/D	N/D	N/D
	291067	Surgeons	18	3,084	0.6
	291069	All Other Physicians & Surgeons	20	4,731	0.4
	291071	Physician Assistants	22	3,468	0.6
	291081	Podiatrists	N/D	N/D	N/D
	291122	Occupational Therapists	45	7,167	0.6
	291123	Physical Therapists	49	8,753	0.6
	291126	Respiratory Therapists	85	5,689	1.5
	291127	Speech-Language Pathologists	17	4,207	0.4
	291141	Registered Nurses	1,694	112,658	1.5
	292021	Dental Hygienists	20	10,482	0.2
	292034	Radiologic Technologists & Technicians	189	13,349	1.4
	292052	Pharmacy Technicians	49	3,516	1.4
	292061	Licensed Practical & Licensed Vocational Nurses	273	16,273	1.7
	311014	Nursing Assistants (CNAs)	2,245	80,710	2.8
	312021	Physical Therapist Assistants	30	3,732	0.8
	319091	Dental Assistants	33	8,640	0.4
	394011	Embalmers	N/D	N/D	N/D
	394031	Morticians, Undertakers and Funeral	N/D	N/D	N/D
		Licensed Occupation Subtotal[c]	4,960	325,064	1.5
Public Administration (92)		Total, All Occupations in Public Administration	8,213	654,689	1.3
	193031	Clinical, Counseling, & School Psychologists	N/D	N/D	N/D
	211019	All Other Counselors	N/D	N/D	N/D
	211029	All Other Social Workers	5	1,235	0.4
	291021	Dentists, General	N/D	N/D	N/D
	291122	Occupational Therapists	N/D	N/D	N/D
	291141	Registered Nurses	50	10,194	0.5
	292021	Dental Hygienists	N/D	N/D	N/D
	292034	Radiologic Technologists & Technicians	5	545	0.9
	292052	Pharmacy Technicians	N/D	N/D	N/D
	292061	Licensed Practical & Licensed Vocational Nurses	8	1,864	0.4
	311014	Nursing Assistants (CNAs)	99	10,191	1.0
	394011	Embalmers	N/D	N/D	N/D
		Licensed Occupation Subtotal[c]	178	26,304	0.7
Total, All Industries		**Total, All Occupations**	**71,310**	**7,793,553**	**0.9**

[a]North American Industry Classification System.

[b]Standard Occupational Classification.

[c]Licensed occupations that incurred one or more workers' compensation claims.

N/D = Not discloseable due to confidentiality.

Source: Workforce Data Quality Initiative (WDQI) custom extract.

Prepared by P. Manning, Research & Planning, WY DWS, 3/27/17.

(Text continued from page 83)

worked in any given quarter, which is utilized in this report.

The Research & Planning (R&P) section of the Wyoming Department of Workforce Services is the only state agency that has access to all three of these databases. This research has never been conducted and therefore, no methodological precedent has been established. One goal of this research is to aid in establishing a methodology to further examine these topics.

Methodology

Data from 2010 to 2015 from the workers' compensation, licensed health care occupations, and wage records databases were used in this analysis. The workers' compensation dataset contained some observations with missing or erroneous industry data (based on the North American Industry Classification System) and/or unemployment insurance taxation information. Of all workers' compensation claims, 91.0% could be accurately assigned to an industry; the remaining 9.0% could not be assigned to an industry.

As shown in Box 7.1, the incidence rate was calculated by dividing the number of workers' compensation claims from the workers' compensation database (the numerator) by the possible quarters of exposure risk obtained from the Wage Records database (the denominator). For example, as shown in Box 7.1, there were 11,350 workers' compensation claims in Wyoming's health care & social assistance sector (NAICS 62) from 2010 to 2015. During that time, there were 829,988 quarters of exposure risk for all individuals working in health care & social assistance. Dividing the numerator (11,350 workers' compensation claims) by the denominator (829,988 quarters of exposure risk) produces an incidence rate of 1.4%.

Results

Comparing Data

The average injury incidence rate across all industries in Wyoming was 0.9% from 2010 to 2015 (71,310 workers' compensation claims divided by 7,793,553 quarters of exposure risk). By comparison, Wyoming's nonfatal occupational injury and illness incidence rate for 2015 was 3.3%,

Box 7.1: Calculating the Incidence Rate

$$\frac{\text{Number of Workers' Compensation Claims}^{a}}{\text{Possible Quarters of Exposure Risk}^{b}} = \text{Incidence Rate}$$

Example:
There were 11,350 workers' compensation claims in Wyoming's health care & social assistance sector (NAICS[c] 62) from 2010 to 2015. During that time, there were 829,988 quarters of exposure risk for all individuals working in health care & social assistance. Therefore, the incidence rate was 1.4%.

$$\frac{11{,}350}{829{,}988} = 1.4\%$$

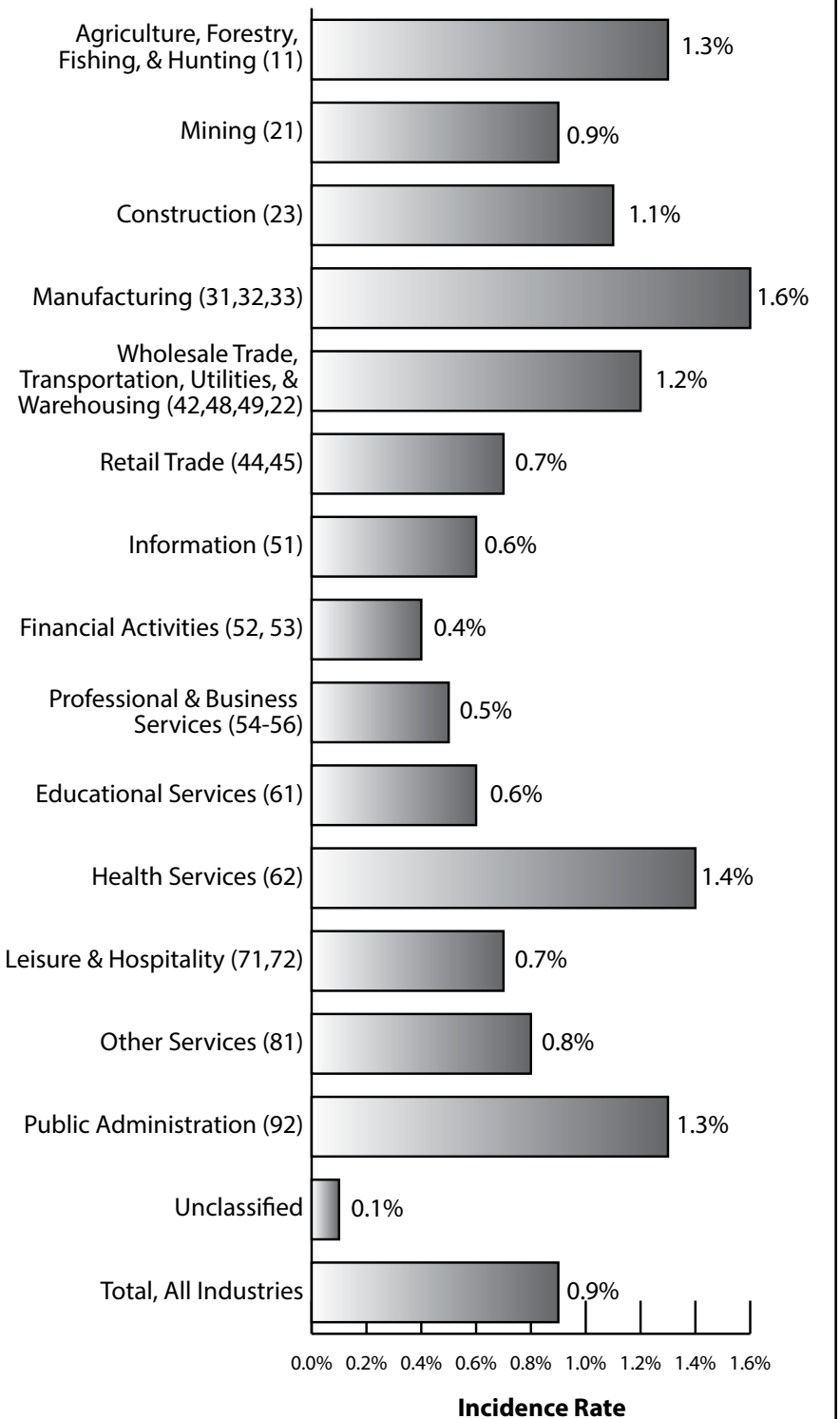
[a]Source: Workers' Compensation database.
[b]Source: Wage Records database.
[c]North American Industry Classification System.
Prepared by M. Moore, Research & Planning, WY DWS, 4/18/17.

according to the U.S. Bureau of Labor Statistics (BLS, 2016). There are differences in how R&P calculated the injury incidence rate for this research (see the methodology section) and how the BLS calculates its nonfatal occupational injury and illness incidence rate. For example, the BLS' methodology uses a sample survey of employers (instead of all incidences of injuries), the use of only private industry, the use of only 2015 data, and the incidence rate per 100 full-time workers. When converted to an incidence rate per quarter, the BLS' nonfatal occupational injury and illness incidence rate of 3.3% becomes 0.8%, similar to R&P's average injury incidence rate of 0.9%.

Industry

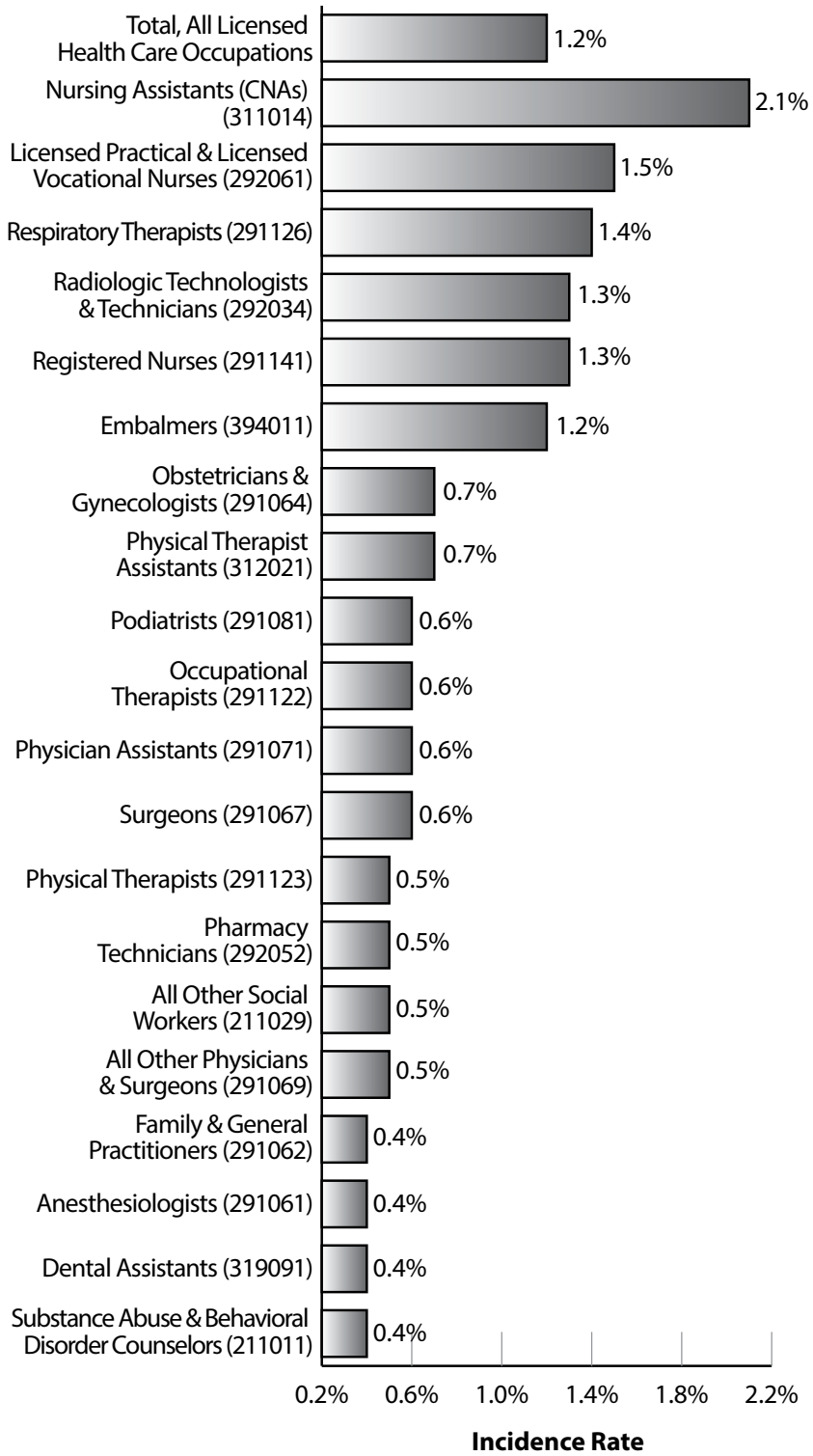
As shown in Table 7.1 and Figure 7.1, manufacturing (NAICS 31-33) experienced the highest incidence rate of injuries (1.6%) in Wyoming, followed by health care & social assistance (NAICS 62; 1.4%); agriculture, forestry, fishing, & hunting (NAICS 11; 1.3%); and public administration (NAICS 92; 1.3%).

Public administration (NAICS 92) experienced a higher injury incidence rate than industries such as



[a]North American Industry Classification System.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
Prepared by P. Manning, Research & Planning, WY DWS, 3/27/17.

Figure 7.1: **Incidence Rate of Workers' Compensation Claims by Industry and NAICS[a] Code, 2010-2015**



[a]Standard Occupational Classification.
Source: Workforce Data Quality Initiative (WDQI) custom extract.
Prepared by P. Manning, Research & Planning, WY DWS, 3/27/17.

Figure 7.2: **Top 20 Licensed Health Care Occupations and SOC[a] Code by Incidence Rate of Workers' Compensation Claims, 2010-2015**

construction (NAICS 23) and mining (NAICS 11). This is because a large component of public administration is publically owned hospitals and services such as law enforcement and emergency services, and therefore contains occupations with relatively high risks of injury.

Licensed Health Care Occupations

Across all industries in Wyoming, the overall injury incidence rate of licensed health care occupations was 1.2%. Certified nursing assistants (CNAs; SOC 31-1014) demonstrated the highest incidence rate of 2.1%. The three major classifications of nursing occupations – certified nursing assistants, licensed practical & licensed vocational nurses (LPNs), and registered nurses (RNs) – were all included in the top five occupations that experienced the highest incidence rates from 2010 to 2015 (see Table 7.1 and Figure 7.2). Previous research from R&P also demonstrated relatively high incidence rates for nurses in Wyoming (Leonard, 2012).

Occupations within Selected Industries

For this research, R&P identified the four industries in which the greatest

number of licensed health care occupations were found: retail trade (NAICS 44-45), educational services (NAICS 61), health care & social assistance (NAICS 62), and public administration (NAICS 92). As shown in Table 7.1, incidence rates for an occupation may vary by industry. For example, for 2010 to 2015, the average incidence rate for CNAs working in retail trade was 0.6%, compared to 2.8% for CNAs working in health care & social assistance.

It is important to understand that incidence rates can be misleading when the denominator is very small. For example, if the denominator consisted of 10 quarters and one workplace injury occurred, then the incidence rate was 10%. This rate can be far from the rate of a larger sample, such as the statewide rate. Therefore, the occupations with very few observations were not the focus of this analysis.

Table 7.1 shows that nurses tended to have relatively high injury incidence rates in the four selected industries, particularly in health care & social assistance, where the incidence rate of 2.8% for CNAs was more than three times greater than the overall rate of 0.9% across all industries and occupations.

Conclusions

The manufacturing (NAICS 31-33) and health care & social assistance (NAICS 62) industries demonstrated the highest injury incidence rates from 2010-2015. As has been discussed previously, health care related occupations tend to demonstrate higher rates of workplace injuries relative to the overall employed population. As noted by Knapp (see Chapter 2), the need for workers in the health care sector in Wyoming and the U.S. is projected to increase. To ensure that the demand for health care workers (and other high risk occupations) is met, injury prevention efforts could lead to a decrease in workplace injuries.

While the efficacy of workplace injury prevention programs is not addressed in this analysis, the importance of these programs should be noted. Programs to prevent workplace injuries are available to Wyoming employers. For example, the Wyoming Department of Workforce Services has a drug-free workplace discount and a safety discount, and to qualify, an employer must have a documented health and safety program (DWS, n.d.).

The combination of injury prevention efforts and workplace injury prevention programs may help alleviate labor shortages within health care specifically, and across all other occupations generally.

Future Research

Research & Planning has the ability to conduct research on a variety of topics related to rates of injury and workplace safety. Future research efforts may include:

- Incidence rates of injury calculated by other factors, such as industry size or workers' age, gender, or other demographic information;
- Incident rates calculated by industry and overall work experience; and
- Differentiating incidence rates by medical only claims and indemnity claims.

References

Bonner, M. (2016, May 9). Workers' compensation insurance in monopolistic states. In *The Balance*. Retrieved from https://www.thebalance.com/workers-compensation-insurance-in-monopolistic-states-462813

Leonard, D. (2012). Nursing employment in Wyoming dashboards. Retrieved April 5, 2017, from http://doe.state.wy.us/LMI/nursing/2012/DASHBOARDS_COMPLETE_FEB2012.pdf

Wyoming Department of Workforce Services. (n.d.). Workers' compensation discount programs. Retrieved March 28, 2017, from http://www.wyomingworkforce.org/_docs/wc/info-on-all-discount-programs.pdf

U.S. Bureau of Labor Statistics. (2016, October). Industry injury and illness data – 2015. Summary news release. Retrieved on March 28, 2017, from https://www.bls.gov/news.release/archives/osh_10272016.pdf

Research & Planning
Wyoming DWS

Wyoming Department of Workforce Services, Research & Planning
P.O. Box 2760
Casper, WY 82602

Official Business
Penalty for Private Use $300
Return Service Requested

PRSRT STD
US POSTAGE PAID
CASPER WY
PERMIT NO. 100